The form and function of aggressive subtypes: Relations with the goodness of fit between adolescent temperament and parent personality

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Abstract

The current research investigated whether the interaction between adolescent temperament and parent personality, consistent with the goodness of fit perspective, differentially predicted overt (e.g., kicking, punching, insulting) and relational (e.g., gossiping, rumour spreading, ostracising) forms of reactive (e.g., provoked, a response to goal blocking, unplanned and emotional) and proactive (e.g., unprovoked, goal-directed, deliberate and relatively unemotional) aggression. Mothers, fathers and their adolescent child (N = 448, age 10-17) from southern Ontario, Canada filled out questionnaires on adolescent temperament (i.e., frustration, fear, and effortful control) and aggression. Parents reported on their own personality traits (i.e., agreeableness, conscientiousness, and emotional stability). The form and function of aggression not encompassed by the subtype under investigation were controlled in each regression analysis. Consistent with the hypothesis, results indicated that a poor fit between adolescent temperament vulnerabilities and lower parent personality traits, including agreeableness, conscientiousness and emotional stability, was predictive of greater levels of differentiated aggression. For instance, lower father conscientiousness strengthened the relation between higher frustration and reactive overt aggression. Unexpectedly in some cases, temperament risk factors were more strongly associated with aggression subtypes when personality scores were at higher levels, particularly agreeableness and conscientiousness, traits normally considered to be at the optimal end of the dimension. For example, higher father agreeableness strengthened the relation between higher frustration and reactive relational aggression. At the main effects level, low fearfulness

was significantly associated with only the overt subtypes of aggression, and unexpectedly, higher frustration and lower effortful control were related to both proactive and reactive subtypes of aggression. A temperamentally vulnerable adolescent was also at greater risk of displaying aggressive behaviour when the father lacked emotional stability, but not the mother. These results are broadly consistent with the prediction that temperament risk factors are more strongly associated with aggression subtypes when an adolescent predisposition does not fit well with parent personality traits. Mechanisms pertaining to stress in the family environment and the fostering of self-regulation abilities are discussed with respect to why a poor fit between temperament and parent personality is predictive of adolescent differentiated aggression.

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Table of Contents

Abstract ii

Acknowledgements iv

List of Tables ix

List of Figures x

List of Appendices xii

Introduction 1

Aggressive Behaviour: Undifferentiated and Differentiated 3

Undifferentiated Aggressive Behaviour. 3

Differentiated Aggressive Behaviour. 3

Risk Factors of Aggressive Behaviour. 5

Temperament 6

Concept. 6

Individual Differences in Temperament. 9

Temperament and Aggressive Behaviour 12

Temperament Predicting Undifferentiated Aggression. 12

Temperament Predicting Differentiated Aggression. 13

Adolescent Temperament, Parent Personality, and Aggressive Behaviour 16

Concepts of Transactional Processes and Goodness-of-Fit. 16

Temperament *versus* Personality 18

Undifferentiated Aggression. 20

Differentiated Aggression 29

Summary of Hypotheses 31

Methods 35

Participants 35

Procedure 36

Measures 36

Demographics 36

Adolescent temperament. 37

Adolescent aggression. 39

Parent personality. 39

Results 41

Plan of Analysis 41

Preliminary Analysis 44

Hierarchical Regression Results 45

Proactive-overt aggression. 47

Proactive-relational aggression. 52

Reactive-overt aggression. 57

Reactive-relational aggression. 63

Discussion 66

General Findings 66

Temperament Vulnerabilities Predicting Aggression Subtypes 67

Findings consistent with previous research. 67

Findings inconsistent with previous research. 68

Summary 71

Temperament-Personality Interactions Predict Aggression Subtypes 71

Consistent findings. 71

Supportive findings. 74

Inconsistent findings. 76

Summary. 78

Mother and Father Differences 79

Limitations and Strengths 81

Future Directions and Implications 82

Conclusions 84

References 85

Appendix A 103

Aggression Terminology 103

Appendix B 105

Social Development Model 105

Appendix C 106

Temperament *versus* Psychopathology Concepts 106

Appendix D 107

Youth Survey 107

Demographic Questionnaire 107

Temperament Questionnaire 108

Aggression Questionnaire 112

Appendix E 114

Parent Survey **114**

Demographic Questionnaire 114

Temperament Questionnaire 115

Personality Questionnaire 119

Aggression Questionnaire 122

Appendix F **125**

Intercorrelations Between Youth, Mother, and Father *Individual* Temperament Variables **125**

Appendix G **126**

Intercorrelations Between Youth, Mother, and Father *Individual* Aggression Subtype Variables **126**

Appendix H **127**

Ethics Clearance Form **127**

List of Tables

Table 1. *Hypothesis 1: Adolescent Temperament and Gender Predicts the Combined Aggressive Behaviour Subtypes.* 31

Table 2. *Hypothesis 2: Two-way Interactions Between Adolescent Temperament Characteristics and Gender Predict Combined Aggressive Behaviour Subtypes.* 32

Table 3. *Hypothesis 3: Three-way Interactions of Adolescent Temperament, Parent Personality, and Gender to Predict Aggression Subtypes.* 33

Table 4. *Means, Standard Deviations, and Cronbach's Internal Consistency Values (α) for all Variables.* 38

Table 5. *Intercorrelations Between Temperament, Personality and Aggression Subtype Variables.* 46

Table 6. *Summary of Mother and Father Regression Results for Proactive Overt Aggression Predicted by Adolescent Temperament, Personality, and Gender.* 48

Table 7. *Summary of Regression Results for Proactive Relational Aggression Predicted by Adolescent Temperament, Personality, and Gender.* 53

Table 8. *Summary of Regression Results for Reactive Overt Aggression Predicted by Adolescent Temperament, Personality, and Gender* 58

Table 9. *Summary of Regression Results for Reactive Relational Aggression Predicted by Adolescent Temperament, Personality, and Gender* 64

List of Figures

Figure 1. General hierarchical regression sequence for testing hypotheses 43

Figure 2. EC interacting with age to predict proactive-overt aggression in mother or father personality associated regressions. 50

Figure 3. Frustration interacting with father emotional stability to predict proactive-overt aggression. 51

Figure 4. Effortful control interacting with father emotional stability to predict proactive-overt aggression. 51

Figure 5. Mother emotional stability interacting with age to predict proactive-relational aggression. 55

Figure 6. EC interacting with mother conscientiousness to predict proactive-relational aggression. 56

Figure 7. Frustration interacting with father conscientiousness and age to predict proactive-relational aggression. 56

Figure 8. EC interacting with father conscientiousness and age to predict proactive-relational aggression. 57

Figure 9. Mother emotional stability interacting with age to predict reactive-overt aggression. 61

Figure 10. Father emotional stability interacting with gender to predict reactive-overt aggression. 61

Figure 11. EC interacting with mother agreeableness and age to predict reactive-overt aggression. 62

Figure 12. Frustration interacting with father conscientiousness and age to predict reactive-overt aggression. 62

Figure 13. Frustration interacting with father agreeableness to predict reactive-relational aggression. 65

Figure 14. Effortful control interacting with father agreeableness to predict reactive-relational aggression. 65

List of Appendices

Appendix A. Aggression Terminology 103

Appendix B. Social Development Model 105

Appendix C. Temperament *versus* Psychopathology Concepts 106

Appendix D. Youth Survey 107

Appendix E. Parent Survey 114

Appendix F. Intercorrelations Between Youth, Mother, and Father *Individual* Temperament Variables 125

Appendix G. Intercorrelations Between Youth, Mother, and Father *Individual* Aggression Variables 126

Appendix H. Ethics Clearance Form 127

Introduction

Daily media coverage reflects the ubiquitous presence of aggressive behaviour in society, and unfortunately, dealing with this behavioural problem is associated with escalating costs as well as extensive social repercussions, including poor adjustment outcomes for the perpetrator and the victim (Dishion & Patterson, 2006; Vitaro, Brendgen, & Barker, 2006; Walton, Ormel, & Krueger, 2011). Aggressive behaviour alongside co-occurring externalizing problems is predictive of multiple outcomes including depression, substance abuse, school drop out, unemployment, delinquency and a life time of crime, all of which take a toll on our health and penal systems (Temcheff, Serbin, Martin-Storey, Stack, Ledingham, & Schwarzman, 2011; Vitaro, Brendgen, et al., 2006). Recently, a new measurement system has provided differentiation between the *forms*, overt and relational, and the *functions,* proactive and reactive, of aggression to improve our understanding of this behavioural construct (Little, Jones, Henrich, & Hawley, 2003). With empirical support for the conceptual distinction between four main *subtypes* of aggression, the possibility arises that linking predictors to differentiated outcomes might provide a better understanding of the multiple developmental pathways to aggressive outcomes (Rothbart, 2004; Rutter, 2003).

Although many risk factors are associated with undifferentiated aggression, the processes involved are not clear as evidenced by the continued search for successful prevention and treatment programs (Dodge, Coie, & Lynam, 2006; Farrell & Vulin-Reynolds, 2007). Despite this, amongst the known risk factors, temperament is considered foundational (Clark, 2005; Frick, 2004; Frick & Morris, 2004; Lahey, 2004;

Muris & Ollendick, 2005; Nigg, 2006; Rettew, 2008; Rettew & McKee, 2005). This suggests that prevention and intervention programs might be more effectively targeted to address the development of aggressive behaviour if clinicians are better armed with an understanding of the relationship between temperament vulnerabilities and aggressive subtype behaviour (Marsee & Frick, 2007; Xu, Farver, Zhang, 2009).

With temperament having been proposed to underscore the processes leading to differentiated aggression, a second issue arises with respect to whether it interacts with other factors in the environment to influence behavioural outcomes. Chess and Thomas (1991) hypothesize this may be answered through the conceptual framework of goodness-of-fit. The idea they put forward is that an interaction between an individual's temperament and his/her environment gives rise to a dynamic process of development. This premise supposes that a temperament dimension will not lead to maladaptive behaviour by itself, but rather in relation to its context. For example, it has already been shown that when temperamental dissonance occurs between adolescent and parent, poor family cohesion ensues leading to suboptimal development (Kristal, 2005). By extension, an interaction between adolescent temperament and parent personality is likely to exemplify an important goodness-of-fit relationship between temperament and the environment (Rettew, Stanger, McKee, Doyle, & Hudziak, 2006). Consequently, analysis of the compatibility between adolescent temperament and parent personality may provide a better understanding of the different developmental pathways to differentiated aggressive behaviour.

Most broadly, then, the purpose of this research is to investigate the nature of individual differences in differentiated aggressive behaviour during adolescence by

exploring the relation among adolescent temperament characteristics, parent personality traits, and the combined subtypes of aggressive behaviour (behaviour defined by both a form and a function).

Aggressive Behaviour: Undifferentiated and Differentiated

Undifferentiated Aggressive Behaviour. The definition of the term "aggressive behaviour" is a source of considerable discussion since it tends to be applied to diverse actions that are *prima facie* very different from one another, for instance, murder and cyberbullying. The most recent attempt at clarification presents aggression as "...a heterogeneous category of human behavior, defined simply as acts intended to harm others, which requires a multifactor framework..." (Dodge et al., 2006, p. 722). It is no surprise, then, that the various terms employed in aggression research give rise to results that are somewhat difficult to reconcile with one another since they refer to various types of aggressive behaviour that are associated simply by the intent to harm and not by any distinction between the behaviours themselves (see Appendix A). To help untangle confounding terminology, a new paradigm has evolved over the last two decades, one that highlights the multidimensional nature of aggressive behaviour (Crick & Grotpeter, 1995; Dodge & Coie, 1987; Little, Brauner, Jones, Nock, & Hawley, 2003; Little, Jones, et al., 2003).

Differentiated Aggressive Behaviour. The recently developed differentiated aggression framework includes four subtypes that are distinguished by form, *overt* and *relational*, and by function, *reactive* and *proactive* (Little, Jones, et al., 2003; Prinstein & Cillessen, 2003). Direct, physical, or overt aggression is defined as both verbal and

physical behaviour that encompasses such actions as threats of aggression, hitting and punching, murder or deliberate destruction of property. Contrasting with this is relational aggression, also referred to as social or indirect aggression, which involves behaviours that damage social relationships and destroy feelings of inclusion. Importantly, gender differences are observed in the employment of these two forms of aggression. While female adolescents use relational aggression more often than overt, and overt aggression to a lesser extent than males, there appears to be no difference between the two genders in the use of relational aggression by adulthood (Côté, 2009). With respect to the functions of aggressive behaviour, reactive aggression is seen as an angry defensive response to negative stimuli or provocation, whereas proactive or instrumental aggression is offensively motivated by the anticipation of achieving goals related to self-serving outcomes. Surprisingly, there are no clear gender differences despite evidence in the animal kingdom to indicate the contrary (Polman, de Castro, Koops, van Boxtel, & Merk, 2007). In spite of this theoretical distinction between the four subtypes significant intercorrelation exists between the two functions, and between the two forms, which suggests that that these concepts overlap to some degree (Fite, Stauffacher, Ostrov, & Colder, 2008; Little, Jones, et al., 2003).

Over the last several decades, there have been a number of different approaches to the study of differentiated aggression. While many investigators have examined dichotomies of differentiated aggression by comparing only overt with relational forms, or proactive with reactive functions (e.g., Dodge & Coie, 1987; Crick, Ostrov, Burr, Cullerton-Sen, Jansen-Yeh, & Ralston, 2006; Xu & Zhang, 2008), others have recently

begun to take form and function into consideration simultaneously (e.g., Little, Jones, et al., 2003; Prinstein & Cillessen, 2003). In this regard, there have been attempts to statistically separate form from function, resulting in measures of pure overt and relational aggression, as well as, reactive and proactive aggression independent of form (e.g., Little, Jones, et al., 2003). Other investigators have considered function as embedded in a form, and thus, have examined reactive-overt, reactive-relational, proactive-overt and proactive-relational subtypes (e.g., Bailey & Ostrov, 2008; Murray-Close, Ostrov, Nelson, Crick & Coccaro, 2010; Ostrov & Crick, 2007). In some instances, the procedures include controlling statistically for the opposite form and function, to isolate the specific features of a subtype from general aggressive tendencies (e.g., Marsee, Weems, & Taylor, 2008). It is these last aggressive subtypes that will be examined in the present research with respect to individual differences in temperament, and goodness-of-fit between adolescent temperament and parent personality.

Risk Factors of Aggressive Behaviour. Despite the recent increases in conceptual clarity, most research to date has been limited to studying the risk factors of aggressive behaviour in its undifferentiated form (Moffitt, 2005). These predictors fall primarily under two domains: intraindividual variables including genetic factors, temperament and cognitive correlates, and environmental or interpersonal factors including family and peer relations (McMahon & Frick, 2005; Rutter, 2003). In fact, there are many factors associated with aggressive behaviour that are well reviewed elsewhere, and this suggests that a multifactoral model best describes the development of aggressive antisocial behaviour (ASB; Dodge et al., 2006; Dodge & Pettit, 2003). However, among

the many determinants, temperament stands out since extensive research establishes it as a well-known underlying risk factor despite the subtleties of the mechanism still being unraveled (Dodge et al., 2006). Recent hypotheses also conceptualize temperament as a 'unifying basis' for the many different developmental pathways that lead to individual differences in behaviour, including aggressive behaviour (Clark, 2005; Frick, 2004; Lahey, 2004; Muris & Ollendick, 2005; Nigg, 2006; Rettew & McKee, 2005; Rothbart, 2004). In spite of this, very little research investigates the association between temperament characteristics and aggressive behaviour subtypes. Before reviewing this limited research, first the temperament framework will be described to facilitate explanations of individual differences in temperament in relation to aggressive behaviour.

Temperament

Concept. Temperament is defined "as constitutionally based individual differences in reactivity and self-regulation, in the domains of affect, activity, and attention" (Rothbart & Bates, 2006, p. 100). It includes consideration of the biological constituents of temperament and a framework that divides the temperament construct into two primary domains, reactivity to internal and external environments, and self-regulation, which refers to those processes involved in modulating reactivity (Putnam & Stifter, 2008). Since the reactive and regulatory components of temperament come on line at different times, Rothbart studies temperament from a developmental point of view with questionnaires for different age groups to help elucidate these changes in temperament (Rothbart, Ahadi, & Evans, 2000). The work to date reveals that the temperament structure incorporates, albeit in varying quality and quantity over the different

developmental periods, the four broad dimensions of positive affect (PA; surgency/extraversion), negative affect (NA; frustration/irritability), self-regulation, and affiliativeness (Putnam, 2006). One questionnaire amongst the six instruments developed is the Early Adolescent Temperament Questionnaire (EATQ), which taps into a pivotal period of biological maturation, second to that occurring in infancy, and is based on adult measures adapted to draw on experiences relevant to this age (Capaldi & Rothbart, 1992). A revised instrument (EATQ-R) updates the temperament aspect of self-regulation, which is perceived to be a dimension of particular importance to the adaptive functioning of this age group (Ellis & Rothbart, 2001; Nigg, 2006).

The factor analytic technique used by Rothbart emphasizes the hierarchical structure of temperament whereby four broad dimensions encompass factors characteristic of each developmental period. In adolescence, the dimension of NA is associated with defensive reactions such as irritability and frustration (Ellis & Rothbart, 2001). In contrast, the PA dimension is linked with approach reactions like high intensity pleasure and extraversion, or inversely, low levels of fear and shyness, even though fear and shyness normally factor in with the dimension of negative affect for all other age groups (Ellis & Rothbart, 2001). The regulatory dimension of temperament is related to attentional, activational, and inhibitory control, and is often referred to collectively as effortful control (EC; Rothbart, 1989c; Rothbart & Sheese, 2007). This term was coined by Rothbart and colleagues and is best understood as "... the ability to inhibit a dominant response to perform a subdominant response, to detect errors, and to engage in planning..." (Rothbart & Rueda, 2005, p. 169). All these regulatory processes are linked with, and subsumed under, the cognitive construct of executive attention, sometimes also

described as the anterior attention network (AAN; Posner & Rothbart, 2007). Last, is the least well-studied factor of affiliation, under the broad dimension of agreeableness or affiliativeness, which probes into the desire for warmth and closeness with others but is independent of extraversion and shyness.

Early on, Rothbart and Derryberry (1981) also made the argument that a temperament approach combines many research domains to view individuals "...as an integrated system, consisting of a range of affective-motivational capabilities and limitations, together with a set of cognitive, behavioral and social 'strategies' for fulfilling these requirements..." (p. 38). This systems approach revolves around their hypothesis that the various components of temperament are centered on the goals or motivations of the organism, and that these goals are both evolutionarily conserved in the genes and environmentally driven by experience (Rothbart & Sheese, 2007). Furthermore, Derryberry and Rothbart (1997) propose that at least four major motivation systems exist, including one for appetitive and approach behaviour, another for defensive or harm-avoidance, a third for frustrative and aggressive behaviours, and a last one for affiliative and nurturant needs or goals. These biological systems are thought to assess relevant stimuli and then organize behaviour in accordance with goals or motivations. Alongside and partnering the motivational systems of temperament are the attentional networks; one functions to alert the individual, the second orients attention toward relevant stimuli, and a third is postulated as the conscious executive control or EC of the affective-motivational systems and the first two attentional networks (Posner & Rothbart, 2007).

Individual Differences in Temperament.

Environmental factors. At a behavioural level of analysis, interactions between temperament and the environment are proposed to be integral to the development of individual differences in aggressive behaviour (Derryberry & Rothbart, 1997). In fact, Derryberry and Rothbart (2001) suggest that temperament characteristics develop over time to follow a normative pathway and allow for individual differences relating to the interplay between constitutional and environmental factors (Nigg, 2006; Rothbart, 2007; Rothbart & Bates, 2006). For instance, infants with a predisposition to high NA alter their frustration level or defensive behaviour once regulatory processes are engaged through socialization in early childhood, whereas infants in whom strong voluntary control or EC is not developed are more likely to display maladaptive behaviour throughout their lifetime. In addition, children with particularly extreme temperament characteristics are most vulnerable to maladaptive outcomes when exposed to poor parenting practices (Rothbart & Putnam, 2002). Alternatively, callous-unemotional (CU) traits in the child are found to predict reduced parental monitoring over time (Muñoz, Pakalniskiene & Frick, 2011). This idea of a reciprocal influence between child and parent is also thought pertinent to the behavioural outcomes of poorly regulated and highly reactive adolescents. When exposed to harsh parenting, temperamentally vulnerable adolescents are much more likely to engage in aggressive behaviour (Xu et al., 2009). Thus, evidence supports Rothbart's conceptualization of temperament as an open system, one that involves an interaction between the temperament characteristics of emotional reactivity and cognitive regulation that are both constitutionally derived and predetermined on the one hand, and

open to experience and adaptation on the other. This interplay gives rise to individual differences that are inextricably linked to adaptive or maladaptive behavioural outcomes, and again points to the multiple routes by which aggressive behaviour might develop (Henderson & Wachs, 2007).

Effortful control. Studies on EC demonstrate that variation in this voluntary attention is associated with differences in executive functioning and social-emotional outcomes, such as aggression (Kochanska, Murray, & Harlan, 2000; Posner & Rothbart, 2007). For example, an inability to flexibly direct attention during periods of frustration is associated with externalizing behaviours (Derryberry & Rothbart, 1997). It supports the idea that EC processes are integral to the regulation of emotion through inhibition, activation, or graded modulation of all incoming stimuli (Rothbart & Sheese, 2007). Additionally, the variable degree to which EC regulates emotional processes through voluntary attention emphasizes the flexible balance between reactive and regulatory systems. For instance, developmental differences between children and adults in resolving conflict are seen well into adolescence and early adulthood, suggesting executive control functions might not be fully mature before individuals reach their mid-twenties (Rothbart & Rueda, 2005). This gradual development of EC is particularly relevant to studies of adolescent aggression since unregulated reactive or frustrative behaviours are frequently associated with aggressive behaviour (Dodge et al., 2006). It also indicates there are critical ages when temperament dimensions like EC may take on a causal role in the development of aggressive behaviour.

Reactive control or reactive inhibition. Rothbart and Sheese (2007) argue that emotions essentially regulate each other simply because they involve a reaction with supporting physiological responses. For example, fear will elicit withdrawal, attack or behavioral inhibition, which are all regulatory effects on behaviour. In circumstances where both reward and risk are present, both emotional systems of approach and withdrawal are associated with the process of perception, action tendencies and physical arousal, and thereby, regulate each other. However, this interaction is not necessarily balanced since defense reactions appear to dominate, although this is not true in all individuals. Indeed, at one end of the behavioural spectrum are those who express inhibited behaviour in response to unfamiliar stimuli, and at the other end of the scale, those who respond uninhibitedly (Nigg, Carr, Martel, & Henderson, 2007). The latter group of individuals manifest little fear or reactive control over their approach behaviour, and in contrast to EC, this regulatory process is involuntary and driven by an individual's reactive characteristics and autonomic responses. At present, there is still debate over whether these individuals are best described as being behaviourally disinhibited, having low anxiety and fear, displaying high approach tendencies, or exhibiting any combination of these characteristics (Nigg, 2006). Nevertheless, those that display CU traits associated with a particularly severe and stable type of psychopathic aggression are much more likely to have a lower sensitivity to punishment and a limited experience with intense emotions (Nigg, 2006; Woltering & Lewis, 2009). Moreover, reduced levels of fearfulness, a reactive regulatory characteristic described by Rothbart, is commonly associated with CU or psychopathic youth that display an aggression that is different from other antisocial adolescents (Frick & White, 2008). Thus, this body of work substantiates

the conceptualization of a second regulatory process forged through the reactive components of temperament that is part of an open system interacting with the environment. Any individual differences in these reactive characteristics, such as fear, appear to link with individual differences in aggressive behaviour.

Temperament and Aggressive Behaviour

Temperament Predicting Undifferentiated Aggression. Generally, empirical investigations reveal that child and adolescent high NA predicts both internalizing and externalizing behaviours, although the factors of anger and frustration are more closely tied to externalizing behaviours (Eisenberg, Sadovsky, Spinrad, Fabes, Losoya, Valiente et al., 2005; Meesters, Muris, & Van Rooijen, 2007; Muris, Meesters, & Blijlevens, 2007; Oldehinkel, Hartman, Ferdinand, Verhulst, & Ormel, 2007; Ormel, Oldehinkel, Ferdinand, Hartman, DeWinter, Veenstra et al., 2005; Veenstra, Lindenberg, Oldehinkel, De Winter, & Ormel, 2006). While the NA factors of fear and sadness are strongly associated with internalizing behaviours, their relationship with externalizing problems is less certain since sadness and fear are both positively and negatively associated with this type of behaviour (Eisenberg et al., 2005; Rettew, Copeland, Stanger, & Hudziak, 2004; Richter, Krecklow & Eisemann, 2002). With respect to regulatory processes, the temperament dimension of low EC is found to predict internalizing and externalizing behaviours. As well, a significant interaction effect is found between high NA and low EC in conjunction with internalizing and externalizing behaviours, namely NA characteristics of fearfulness and frustration, respectively (Meesters et al., 2007; Muris, 2006; Muris, et al., 2007; Oldehinkel et al. 2007). Furthermore, high

extraversion/surgency, which is part of the PA reactive temperament dimension, is also predictive of externalizing or delinquent behaviours (Muris et al., 2007; Ormel et al., 2005; Rettew et al., 2004; Richter et al., 2002). Last, low affiliativeness is predictive of externalizing behaviours (Ormel et al., 2005).

Temperament Predicting Differentiated Aggression. With the advent of the empirically substantiated forms and functions of aggression, there has been some effort to match temperament factors to differentiated behaviour, particularly in regards to reactive and proactive subtypes. For instance, high NA, or more precisely high frustration (i.e., irritability or anger), and low levels of EC predict reactive aggression (Marsee & Frick, 2007; Vitaro, Barker, Boivin, Brendgen, & Tremblay, 2006; Vitaro, Brendgen, & Tremblay, 2002; Xu et al., 2009). As well, a newly discovered interaction between high anger/frustration and low EC is also associated with reactive aggression (Xu et al., 2009). This temperament profile fits the 'hot-headed' adolescent that responds unwisely to provocation or parenting control tactics, unable to voluntarily inhibit inappropriate behaviours that balloon into aggressive acts. Proactive aggression, on the other hand, is associated with high levels of positive outcome expectancies or sensation seeking (i.e., PA), high CU characteristics or blunted affect (i.e., lack of fear or disinhibition), and inconsistently with low EC (Marsee & Frick, 2007; Raine, Dodge, Loeber, Gatzke-Kipp, Lynam, Reynolds et al., 2006; Nigg, 2006; Vitaro et al., 2002; Xu et al., 2009). Furthermore, an interaction between sensation seeking and low EC has also recently been found to predict proactive aggression in adolescents (Xu et al., 2009). This temperament portrait is characteristic of individuals who are motivated to mastermind acts of

aggression in the pursuit of self-serving goals. They appear explicitly undaunted by the negative consequences to themselves, dismissive of the harmful impact of their actions on others, and unable to restrain their proactive aggressive behaviour.

The association between temperament and the forms of aggression is somewhat less clear. In one study, overt aggression is linked to high novelty seeking (i.e., surgency) and covert aggression with harm avoidance (i.e, behavioural inhibition or fearfulness; Ruchkin, Hägglöf, & Cloninger, 1998). In contrast, another group reported relational aggression being associated with behavioural disinhibition (i.e., fearlessness; Ostrov & Crick; 2005). Physical aggression, on the other hand, is distinctly related to temperament correlates of increased anger and low emotional regulatory abilities (Ostrov & Crick, 2007; Terranova, Morris, & Boxer; 2008) and low fear reactivity (Terranova et al., 2008). With such diverse results, it is no surprise that until now the two forms of aggression are not usually differentiated with respect to temperament dimensions. Instead, the intercorrelated forms are commonly distinguished through distinct developmental pathways and gender differences (Baillargeon, Zoccolillo, Kennan, Côté, Pérusse, Wu et al., 2007; Card, Stucky, Sawalani, & Little, 2008; Côté, 2009; Ostrov & Crick, 2005). With respect to gender, Côté (2009) suggests that aggressive males and females differ in their use of overt and relational aggression over development; a small group of males increase their use of overt aggression over time while a few aggressive females desist early on in childhood to replace it with relational aggression. By adulthood, gender differences remain in the deployment of overt aggression but are no longer significant with respect to the use of relational aggression.

Although previous research has shown that reactive and proactive aggression may be differentially related to temperament, there are still gaps in the literature. One of these is the scarcity of research in which the form and function of aggression have been considered simultaneously in relation to temperament. One purpose of this research is to amend this omission by examining the link between temperament, as moderated by gender/age, and the functions of aggression embedded within a particular form (i.e., proactive-overt, proactive-relational, reactive-overt, reactive-relational). Accordingly, this research will investigate, for example, whether a temperamental predisposition to *reactive* aggression manifests as *reactive-overt* aggression in male adolescents and as *reactive-relational* aggression in females.

In addition to simply considering temperament as an isolated predictor, there is also evidence to suggest that these characteristics play a role in transactional processes with the social environment, as forecast by Rothbart's systems approach, which in turn might be used to predict the development of individual differences in aggressive subtype behaviour (Janson & Mathieson, 2008). All these transactional processes encompass the basic premise behind the idea of goodness-of-fit, as hypothesized by Chess and Thomas (1991), where temperament does not lead to aggressive behaviour by itself, but rather in relation to the level of risk within the environment. This idea of temperament interacting in the larger context will be explored next, in regard to its compatibility with parent personality.

Adolescent Temperament, Parent Personality, and Aggressive Behaviour

Concepts of Transactional Processes and Goodness-of-Fit. Previous research has considered several transactional processes between temperament and the environment in relation to aggressive behaviour. One of these is consistent with a gene-environment correlation (rGE), where the interplay between temperament and the family environment is inherently connected through a child and parent's genes and results in a positive correlation between the two; the relationship is strengthened simply because the child will have greater exposure to the 'parent associated' environmental factor. An evocative rGE, for instance, is supported by the evidence of a bidirectional relationship between a child's negative temperament characteristics (e.g., irritability or deficient EC) and poor parenting (e.g., punitive or inconsistent discipline), where they influence one another in a synergistic fashion over time to increase levels of externalizing behaviour (Eisenberg, Fabes, Shepard, Guthrie, Murphy, & Reiser, 1999; Lengua & Kovacs, 2005). A second process that has garnered some attention is the concept of gene-environment interactions (GxE), where temperament and the home environment are considered independent of one another. This interaction involves the effects of one variable varying across levels of another, where greater temperament vulnerabilities or genetic susceptibilities on the part of the adolescent will likely give rise to greater levels of aggression in certain risk environments (Lau & Eley, 2008, Rutter, Moffitt, & Caspi, 2006). Most of this research has focused on temperament in the context of parenting, where children with difficult temperaments are more likely to develop externalizing behaviours when exposed to negative parenting behaviours (van Aken, Junger, Verhoeven, van Aken, & Deković,

2007a; Bradley & Corwyn, 2008; Karreman, de Haas, van Tuijl, van Aken, & Deković, 2010). While both these transactional processes are often studied separately, there is evidence to suggest that rGE and GxE co-occur and are both likely to play a role in the development of aggressive behaviour (Lau & Eley, 2008). Both of these processes also run parallel with the concept of diathesis-stress, which postulates that a pre-existing vulnerability interacts with a stressful life event to give rise to an undesirable behavioural outcome (Holmes & Rahe, 1967). For instance, if an adolescent with non-optimal characteristics encounters a stressful home environment, there is a greater probability of the adolescent developing maladaptive behaviour. In terms of aggression specifically, a poor fit consisting of an adolescent's vulnerable temperament characteristics and a stressful home environment is surmised to direct developmental outcomes along antisocial pathways.

While parenting is frequently studied as an environmental stressor in conjunction with aggression, a negligible amount of work has investigated Belsky's (1984) contention that parent personality is also important and should be incorporated into developmental models of adaptive and maladaptive child behaviour (Belsky & Barends, 2002; Caspi & Shiner, 2006). Subsequently, one area that might benefit from further investigation is research into the goodness-of-fit between adolescent temperament and parent personality, especially in the context of the increasing evidence for complex parent-child interactions outside the parenting framework (Baumrind, 1966; Belsky & Jaffee, 2006; Bornstein, 2006; Gray & Steinberg, 1999; Kochanska, 1997; Prinzie et al., 2004). Thus, the second major purpose of this research is to investigate whether a poor fit between adolescent temperament and parent personality predicts the different aggressive subtype behaviours.

However, before delving into the possible repercussions of this type of interaction, it is important to describe first the domain of personality and where it intersects with temperament.

Temperament *versus* Personality. Currently, there is some consensus that temperament processes are embedded in biology and represent a subdomain of personality, which is further differentiated by socialization to give rise to individual cognitions, beliefs, and values (Caspi & Shiner, 2006; Evans & Rothbart, 2007; Shiner & Caspi, 2003; Tackett, 2006). Convergence between various personality models over the last few decades has led to a relatively systematic approach in assessing personality dimensions based on a five-trait structure captured by the *Big Five* or Five Factor Models (Goldberg, 1999; McCrae & Costa, 2008). Lately there has also been evidence for a six factor structure, which is based on a lexical analysis of personality across different languages, namely the HEXACO model (Ashton et al., 2004).

The five factor models mentioned above are empirically associated, although conceptually discrete, and generally include dimensions of *surgency/extraversion*, *emotional stability*, *conscientiousness*, *agreeableness*, and *intellect/imagination* to experience. The surgency trait pertains to characteristics of sociability, energy, activity, the need for stimulation, and typical positive emotions such as smiling and laughter at the high end. The dimension of emotional stability incorporates factors of neuroticism at the lower end, including worry, nervousness, anxiety, irritability, feelings of insecurity or vulnerability, and other common negative emotions. The trait of conscientiousness is reflected by individual differences in self-control across this dimension, which in turn

taps into individual differences in the capacity for attention, persistence, planning, organization, and generally thought before action responses. Interpersonal components of personality coalesce under the trait of agreeableness to include prosocial behaviours of warmth, empathy and consideration at the high end, to antisocial behaviours of aggression, lack of cooperation, suspicion, rudeness and cynicism at the low end of this trait. The fifth personality trait is nominally called intellect but branches out at the higher end to identify those with more curiosity, broader interests, and greater creativity. In the HEXACO model, a new sixth factor of *honesty/humility* has been included alongside a content change to the agreeableness and emotional stability (called emotionality in HEXACO) traits (Acton, 2001; Ashton & Lee, 2008). This last factor involves such descriptors as modesty, sincerity, and fairness.

While temperament and personality have been essentially studied as separate research domains, the conjecture is that the first four personality traits mentioned in the Big Five are a corollary of temperament characteristics, such as those identified by Rothbart's temperament model (Evans & Rothbart, 2007; Putnam, Sanson, & Rothbart, 2002; Rettew & McKee, 2005). In recent times, there has even been a push to integrate these two areas of research into one conceptual framework (De Pauw & Mervielde, 2010). Although this endeavour is still speculative, initial evidence does correlate temperament characteristics to the Big Five or Five Factor Model; surgency with PA, emotional stability inversely with NA, conscientiousness with EC, and finally, agreeableness with affiliativeness (Evans & Rothbart, 2007; Shiner & Caspi, 2003).

Undifferentiated Aggression.

Direct effects. It is surprising that little work has investigated parent personality as one of several components crucial to the development of child or adolescent maladaptive outcomes, especially since Belsky (1984) has identified it as one of three fundamental factors contributing to parenting behaviours. This is most particularly true with respect to the scarcity of research in the adolescent developmental context. There are a few investigations with younger children, however, which have found parent traits of neuroticism (lower levels), extraversion, conscientiousness, agreeableness and intellect to be all modestly associated with the parenting factors of warmth, support and behavioural control (Belsky & Jaffee, 2006; Oliver, Guerin, & Coffman, 2009; Prinzie, Stams, Deković, Reijntjes, & Belsky, 2009). Additionally, a few studies have associated parent personality directly with detrimental child or adolescent aggressive outcomes. In one instance, lower levels of conscientiousness (i.e., EC) or higher levels of anxiety (i.e., NA) in the father predict adolescent delinquency (Heaven, Newbury, & Mak, 2004). This result implies that one pathway to aggressive behaviour stems from the effects of a parent's reactive or regulatory characteristics, although it is unclear whether it is related to genetics, a shared environment, or to both. Moreover, it provides little indication of how parent personality contributes to, and when it is maximally instrumental in, the development of aggressive behaviour.

Mediational effects. As an alternative to simply looking at the direct effects of parent personality, some research has directed attention to the unique contribution of parenting in the relation between parent personality and child or adolescent externalizing

behaviours. For example, lower levels of emotional stability (i.e., higher levels of NA) in parents directly, and indirectly through less supportive maternal parenting, link to toddler aggressive behaviours (van Aken, Junger, Verhoeven, van Aken, Deković, & Denissen, 2007b). This finding supports the premise that one route by which parental personality links with aggressive behaviour is through negative parenting behaviour. It is also consistent with the idea that children seek out their mothers for warmth and security, and if these mothers are less emotionally stable, they may be unable to provide the necessary emotional support to co-regulate the child's emotions, foster a secure attachment with their child or look after their needs. A similar type of investigation found maternal aggressive personality (i.e., anger and irritation) directly, and indirectly through rejecting parenting during early childhood, predicts youth antisocial behaviour (Trentacosta & Shaw, 2008). This evidence also supports a mediated pathway to aggressive behaviour, again through poor interpersonal interactions, but in this instance driven by irritable and hostile behaviour that may arise from a parent's inability to temperamentally cope with the demands of parenting or a stressful lifestyle. A third research group tested whether low parental EC (i.e., conscientiousness) and family chaos (i.e., low parental behavioural control) lead to child externalizing problems through parenting (specifically negative emotional socializing behaviour), and then subsequently, whether parenting leads to externalizing problems through low child EC (Valiente, Lemery-Chalfant, & Reiser, 2007). Both mediated pathways were empirically supported and highlight a relation between insufficient parent conscientiousness and negative parenting that appears to give rise to maladjusted child temperament and behaviour. On a note of interest, the same study also found that high parent EC led to better outcomes via the mediated pathways of

positive emotional parent reactions and higher child EC. Evidently, parent limit setting and firm behavioural control, that is associated with higher levels of conscientiousness, link to beneficial behavioural outcomes. Finally, concurrence with this data comes from a recently published longitudinal study that directly links low maternal conscientiousness with adolescent externalizing problems, and additionally finds evidence for an indirect pathway through deficient parent limit setting (Oliver et al., 2009). Here again, it appears that externalizing behaviours are more likely to arise without the provision of a stable and disciplined environment by conscientious parents, perhaps because these children do not acquire the capabilities or tolerance needed to constrain their own behaviour. Thus, all of these investigations provide empirical support for the involvement of parent high NA and low EC in the development of child or adolescent undifferentiated aggression, with the inference that parenting is a critical environmental conduit or mediator. Despite this important finding, none of these studies speak to a dynamic, or bidirectional, interaction between adolescent temperament and parent personality or its complicity in differentiated aggression.

Moderational effects or goodness-of-fit. With a research goal of investigating the role of parent personality in goodness-of-fit or moderational processes, two mechanisms are proposed to explain why an interaction between adolescent temperament vulnerabilities and non-optimal parent personality traits might be related to the development of reactive and proactive aggression. The first mechanism put forward involves contributions of parent personality to a comprehensive level of stress in the

family environment, and the other concerns the proximal effects of parent personality on adolescent self-regulatory processes, those of effortful and reactive control.

Stressful environment. Parent personality traits are linked with stressful family environments. For instance, research reveals that personality plays a role in marital conflict, whereby greater neuroticism and lower agreeableness are associated with deterioration in husband and wife relations (Belsky & Hsieh, 1998; Ganiban et al., 2009). Alternatively, personality traits of low agreeableness and high neuroticism are related to generalized anxiety disorder (GAD) or traits of high neuroticism with depression (Nigg & Hinshaw, 1998). Both examples of environmental family stressors, marital conflict and parent psychopathology, are consistently paired with child aggressive outcomes, and further, are regarded as products of genetically influenced parent personality (Goldstein et al., 2007; Nigg & Hinhaw, 1998; Ulbricht & Neiderhiser, 2009; Walker, Downey, & Bergman, 1989). While the non-optimal parent traits linked with a stressful home environment are independent of the adolescent per se, they are still implicitly associated with an adolescent's exposure to additional triggers for their reactive and regulatory temperament difficulties. If there is constant provocation by stressful home situations, those with vulnerable temperament characteristics are more likely to lapse into aggressive behaviour, especially when they are overwhelmed and unable to cope. Such an outcome is a reflection of the poor fit between the adolescent and parent, and this fit is probably recognizable by tagging the dyad temperament/personality characteristics. As well, the relative extent to which aggressive behaviour develops is likely dependent on the degree to which the adolescent is susceptible and the extent to which the environment is

stressful, in other words, greater levels of adverse adolescent temperament characteristics represent an increasing diathesis and more disadvantageous parent traits are a proxy for greater environmental stress. The nature of this interaction may also be influenced by genetic processes basic to a passive gene-environment correlation (rGE) mechanism, where the combination of the adolescent's temperamental vulnerability and the risky environment is not considered a random event since both have their origin in a parent's heritable traits (Beaver, DeLisi, Wright, & Vaughn, 2009; Rutter, 2006). Since there are shared genes between the parent and child, the adolescent has a higher probability of inheriting the same non-optimal temperament characteristics, doubling the association of aggression with pathways implicating passive genetic mechanisms. Consequently, non-optimal parent traits will probably contribute to a stressful environment, through both genetic and environmental avenues, and potentially give rise to aggressive behaviour in temperamentally vulnerable adolescents.

Self-regulation: Effortful control. Rothbart's (1981) temperament model proposes EC as an *active* and *voluntary* system that regulates emotion, and lower levels are consistently linked with antisocial behaviour (Martel, 2009; Rothbart, 2004, 2007; Rothbart & Sheese, 2007). Parents with non-optimal traits are not particularly well set to mitigate the difficulties associated with adolescents exhibiting low EC (Oliver et al., 2009 Valiente et al., 2007, van Aken et al., 2007b). For example, those parents characterized by low emotional stability are easily disturbed, regularly irritable, and frequently distressed. A highly reactive and uncontrolled adolescent is primed to ignite any of these attributes. As well, disagreeable parents with little sympathy and time for others, and the tendency to

insult those around them, may easily kindle responses in temperamentally vulnerable adolescents. Alternatively, parents without the conscientious capacity to pay attention to daily family matters are most likely to shirk off the onerous task of parenting. Furthermore, any of these adverse parental behaviours would likely set a poor example for an adolescent, especially those individuals limited in their own capacity to control highly emotional and reactive behaviours. The social learning model reinforces this particular context; undisciplined parents with uncooperative and contrary natures provide inappropriate models of emotion regulation at the same time as not successfully managing their own emotions. Indeed, this extends to parenting behaviours, where those with non-optimal personality traits would be less predisposed to provide effortful guidance via compassionate external behavioural control or participate in co-regulatory practices of EC. Consequently, without the affirmative personality influences of parents, temperamentally vulnerable adolescents would be unlikely to imitate, internalize and deploy appropriately regulated behaviour in provoking or stressful situations. In the scenario where parents must counteract innately poor adolescent effortful control and frustrative predispositions, it is expected that the probability of inheriting parent non-optimal traits, and the environmental interaction between these and the non-optimal traits of the parent, must play a role in the development of differentiated aggressive behaviour.

Self-regulation: Reactive control. The quality of the relationship between a parent and child may be especially important in determining the risk of aggressive behaviour, particularly for adolescents who are temperamentally fearless. Previous research has shown that temperamentally fearless children are more apt to internalize parental values,

develop a conscience, and regulate inappropriate behaviour when the relationship with their parent is characterized by a mutually responsive orientation (MRO), a reciprocally collaborative child-parent partnership liberally suffused with affective positivity (Aksan, Kochanska & Ortmann, 2006; Kochanska & Aksan, 2006). Although temperamentally fearless children have weak reactive control, and thus are unlikely to inhibit aggressive behaviour due to fear of punishment, feelings of guilt, or empathy for their victim, the foregoing research suggests they may learn to inhibit aggressive and antisocial behaviour in the context of a parent-child relationship defined by an MRO. Children will constrain maladaptive behaviour due to having developed moral cognitions or beliefs that it is wrong to engage in such acts, an effortful, cognitive process that is distinct from moral emotions such as guilt and empathy (Kochanska, 1997; Laible, Eye, & Carlo, 2008). Indeed, a good relationship between a parent and child provides the motivation to do so in that it leads to prosocial behaviour and prosocial relationships being experienced as rewarding. To preserve and enhance such a rewarding relationship (i.e., to please the parent), a child is motivated to adopt values consistent with those of the parent, and to self-regulate his/her behaviour in accordance with this shared set of values. The Social Development Model (see Appendix B) augments this reasoning with an emphasis on the development of a prosocial *versus* antisocial bond within a socializing unit, here the parent and adolescent, as protective against developing ASB (Catalano & Hawkins, 1996; Hawkins & Weis; 1985). Without a favourable and reciprocal child-parent bond, there is no internalization of prosocial values and beliefs, which are thought to have an enduring and beneficial effect on individual behaviour (Fleming et al., 2008). Furthermore, a prosocial bond may enable youth low in fear, and perhaps high in surgency, to

deliberately inhibit goal-oriented tendencies that lean toward aggressive activities because they contravene the values and beliefs instilled in them, not because of any guilt or fear.

The development of an MRO or prosocial bond is also proposed to emerge in part out of the characteristics or traits expressed by the individuals within the relationship. As might be expected, evidence shows personality traits are significantly associated with the overall quality and satisfaction of a relationship, whether it is between romantic partners, married couples, or parents and their children (Caspi & Shiner, 2006; Caspi, Roberts & Shiner, 2005; Dyrenforth, Kashy, Donnellan, & Lucas, 2010; Manders, Scholte, Janssens, & De Bruyn, 2006; Neyer & Asendorpf, 2001; South, Krueger, Johnson, & Iacono, 2008). Moreover, personality is thought to evoke behaviours in the partner that contribute to the relationship quality, attributing to personality an active role in the environment. With regard to specific traits, self-report analyses consistently identify neuroticism as the strongest predictor of relationship dissatisfaction (Neyer & Voight, 2004). Alternately, other factors such as agreeableness and conscientiousness are also found to contribute, although to positive relationship outcomes. As well, research that investigates child-parent interactions finds these same three traits in the parent link to whether a shared PA is observed between the dyad (Kochanska, Friesenborg, Lang, & Martel, 2004). By extension, it is presumed that if parents manifest disagreeable and neurotic conduct or insufficient conscientious behaviour, they will lack the necessary attributes to establish an MRO or prosocial bond with their offspring. Without these affirmative bonds, low fear adolescents will neither be exposed to, nor internalize, the prosocial values that are believed to discourage antisocial pursuits. In the framework where parents must counteract low reactive control or fearless dispositions, both the inheritance of non-

optimal parent personality traits on the part of the adolescent, and the environmental interaction of these same traits with their parent's non-optimal personality traits, are likely to be pertinent to the development of differentiated aggressive behaviour.

Previous research. In support of these speculations, one group has statistically substantiated the relevance of a goodness-of-fit relationship between child temperament and parent personality to predict externalizing problems over and above the effects of the child or parent dimensions alone (Rettew et al., 2006). Rettew and colleagues (2006) report a significant interaction between low child novelty seeking (PA) and high levels of mother harm avoidance (i.e., behavioural inhibition) to predict externalizing behaviours over and above the main effects. The inference is that parents exhibiting higher behavioural inhibition manifest a lower investment in their offspring, as perhaps reflected in the formation of a poor interpersonal relationship, which leaves the child open to other influences such as rewarding antisocial associations (Prinzie et al., 2009). In addition, an interaction between high child and high father persistence (i.e., EC) predicts low externalizing problems. These results are compatible with the idea of a conscientious parent providing consistent and focused attention with appropriate modeling of prosocial behaviour (Oliver et al., 2009). Evidence for similar goodness-of-fit research is also shown by work with shy or inhibited children. The overprotective socializing environment provided by mothers with higher levels of neuroticism or lower agreeableness is shown detrimental to adaptive outcomes in shy children, resulting in higher internalizing problems (Coplan, Reichel, & Rowan, 2009). Thus, the matches between adolescent temperament and parent personality identified above illustrate

goodness-of-fit is pertinent to outcomes; a poor fit exacerbates maladaptive consequences and a good fit precipitates normal psychosocial adjustment. Despite the evidence to suggest goodness-of-fit is relevant to aggressive behaviour, this area of research appears limited with respect to undifferentiated aggression and nonexistent in relation to aggression subtypes.

Differentiated Aggression.

Goodness-of-fit and reactive aggression. When considering reactively aggressive individuals, temperament assessments document the probability of higher levels of frustration and lower levels of EC, the combination of which increases the likelihood of developing a negatively emotive individual with poor behavioural control (Marsee & Frick, 2007; Vitaro, Barker, et al., 2006; Vitaro et al., 2002; Xu et al., 2009). Highly reactive individuals with poor self-regulation or EC will struggle to contain their aggressive outbursts when goaded into responding. Consequently, frustration-prone adolescents, or those with low levels of effortful control, are likely to be at increased risk of reactive subtypes of aggression when they live in a stressful family environment, or when their parents are less capable of helping them to regulate their emotions and behaviour. Thus, such adolescents would not fit well with parents possessing personalities characterized by non-optimal personality traits, including low levels of emotional stability, agreeableness or conscientiousness.

Goodness-of-fit and proactive aggression. The scenario describing reactive aggression is not explanatory of proactive aggression simply because the individuals involved in this aggressive subtype behaviour are characterized as having lower levels of

fear and often higher surgency, not usually the higher levels of frustration and lower EC (Marsee & Frick, 2007; Raine et al., 2006; Vitaro et al., 2002; Xu et al., 2009). In this situation, the voluntary regulatory function of temperament or EC is not called into question and any corresponding parental guidance with, or modeling of, emotion regulation is comparatively redundant. Instead, both the MRO and Social Development Model facilitate interpretation of the proposed relation between adolescent temperament-parent personality poor fit and the development of proactive aggression. High PA and low fear adolescents surrounded by sensitive, empathetic, and responsive parents are well placed to assimilate and internalize positive parent messages and develop a strong moral cognition in lieu of moral affect. These positive relationships evolve when more optimal parent personality traits contribute to an overall supportive home environment (Belsky & Jaffee, 2006; Oliver et al., 2009; Prinzie et al., 2009; Shiner & Caspi, 2003). Consequently, temperamentally fearless adolescents, often high in surgency, should be less likely to exhibit proactive subtypes of aggression when they are matched with parents with more optimal personality traits, those high in emotional stability, agreeableness and conscientiousness, with whom it would be easier to develop a positive, prosocial relationship.

Goodness of fit and the forms of aggression. As stated earlier, the relational forms of aggression are more normative for female adolescents, whereas male adolescents are more apt than their female peers to use overt, physical forms of aggression (Baillargeon et al., 2007; Card et al., 2008; Côté, 2009; Ostrov & Crick, 2005). Therefore, it is expected that the form of *reactive* aggression exhibited by frustration-prone, low

effortful control adolescents matched with parents low in emotional stability, agreeableness or conscientiousness would depend on gender, manifesting as *reactive-relational* aggression in girls and *reactive-overt* aggression in boys. The form of *proactive* aggression shown by fearless youth paired with parents low in emotional stability, agreeableness or conscientiousness would likewise be moderated by gender, such that girls would be at risk of *proactive-relational* aggression, and boys *proactive-overt* aggression.

Summary of Hypotheses

The hypotheses for the present study are summarized in Tables 1, 2 and 3, and outlined below.

1. *Hypotheses at the main effects level. (Table 1).*
    1.1. High frustration and low EC are each expected to predict reactive aggression.
    1.2. Low fear is anticipated to predict proactive aggression.

Table 1

Hypothesis 1: Adolescent Temperament Predicts the Combined Aggressive Behaviour Subtypes.

Temperament	Proactive-Overt	Proactive-Relational	Reactive-Overt	Reactive-Relational
Frustration			High	High
Fear	Low	Low		
Effortful Control			Low	Low

Note. Blank cells indicate neither high nor low levels of the temperament characteristic.

2. *Two-way transactional processes between adolescent temperament and gender will uniquely predict the four combined aggressive subtypes over and above their main effects (Table 2).*

   2.1. An interaction between high frustration and gender is hypothesized to uniquely predict overt/relational reactive aggression, with these variables being more strongly associated with overt aggression for male adolescents and more strongly associated with relational aggression for female adolescents.

   2.2. An interaction between low EC and gender is hypothesized to uniquely predict overt/relational reactive aggression, with these variables being more strongly associated with overt aggression for male adolescents and more strongly associated with relational aggression for female adolescents.

Table 2

Hypothesis 2: Two-way Interactions Between Adolescent Temperament Characteristics and Gender Predict Combined Aggressive Behaviour Subtypes.

Proactive-Overt	Proactive-Relational	Reactive-Overt	Reactive-Relational
FE (low) X gen (m)	FE (low) X gen (f)	frus (high) x gen (m)	frus (high) x gen (f)
		EC (low) x gen (m)	EC (low) x gender (f)

Note. Adolescent temperament characteristics: frus = frustration, FE = fear, EC = effortful control; gender = gen: male = m, female = f.

   2.3. An interaction between low fear and gender is believed to uniquely predict overt/relational proactive aggression, with these variables being more strongly

associated with overt aggression for male adolescents and more strongly associated with relational aggression for female adolescents.

3. *Three-way interactions between adolescent temperament, parent personality, and gender will uniquely predict the four combined subtypes of aggression over and above their main effects (Table 3).*

   3.1. An interaction between high frustration, non-optimal parent personality, and gender will uniquely predict overt/relational reactive aggression, with these variables being more strongly associated with overt aggression for male adolescents and more strongly associated with relational aggression for female adolescents.

Table 3

Hypothesis 3: Three-way Interactions of Adolescent Temperament, Parent Personality, and Gender to Predict Aggression Subtypes.

Proactive-Overt	Proactive-Relational	Reactive-Overt	Reactive-Relational
FE (low) x PP (low) x gender (m)	FE (low) x PP (low) x gender (f)	frus (high) x PP (low) x gender (m)	frus (high) x PP (low) x gender (f)
		EC (low) x PP (low) x gender (m)	EC (low) x PP (low) x gender (f)

Note. Adolescent temperament characteristics: EC = effortful control, frus = frustration, FE = fear; parent personality traits: PP = agreeableness or conscientiousness or emotional stability; gender: male = m, female = f.

3.2. An interaction between low EC, non-optimal parent personality and gender will uniquely predict overt/relational reactive aggression, with these variables being more strongly associated with overt aggression for male adolescents and more strongly associated with relational aggression for female adolescents.

3.3. An interaction between low fear, parent personality, and gender will uniquely predict overt/relational proactive aggression, with these variables being more strongly associated with overt aggression for male adolescents and more strongly associated with relational aggression for female adolescents.

Methods

Participants

The subjects for this research came from a longitudinal study investigating the prevention of youth gambling and high-risk behaviour undertaken in the urban and rural area of the Niagara Region of southern Ontario, Canada. Adolescents and their parents were recruited through a previous study and by random digit dialing by an outside agent (Metroline Inc.). Data for the current research was taken from the second of three waves. Each participant met the inclusion criteria of being 10-17 years of age and completion of a questionnaire by the female guardian in the home. The participant group in this second wave was comprised of 395 girls (55%) and 319 boys (45%) with a mean age of 13.91 (*SD* = 2.10). In addition, 674 mothers and 498 fathers also completed a complementary parent survey, with a mean maternal age of 43.18 (SD = 5.38) and mean paternal age of 45.46 (SD = 6.89). Marital status varied among the adult participants to include: 73% married (i.e., mothers), 14% single, 6.6% common law, and 5.2% remarried, and 1.2% unidentified. The median household income was $70,000. The highest level of education obtained by 41% of the mothers was a high school diploma, and by 59% of the mothers was a post secondary degree. With respect to ethnicity, 72% identified themselves as Canadian, 16 % specified European descent of which Italian was the largest group (4.5%), 4% were composed of other diverse ethnicities including Asian (5), South American (2), African (3), American (12) and Native Canadians (3). The remaining 8% did not specify an ethnicity.

Procedure

Families agreeing to participate in the study over the phone were mailed surveys for the youth and parents in the household if they met the inclusion criteria mentioned above. Included in the package was a letter of explanation for the study, separate questionnaires for the adolescent and each parent, consent forms, instructions on how to complete and return the questionnaires, and a two-dollar Tim Horton's coupon as incentive to fill out and return the questionnaires. Of the 1663 families who agreed to receive the package, 828 returned completed questionnaires (50% response), of which 714 met the inclusion criteria for this study. If more than one child fit the criterion of age, parents were instructed to give the survey to the child whose birthday fell closest to the day surveys were received. Each participant was instructed to fill out questionnaires independently and separate envelopes with sufficient postage attached were provided in which they could be sealed for privacy. Participants who completed and returned the survey received $20.

Measures[1]

Demographics. Adolescents were asked to report on their age, gender, grade, family structure and number of siblings. Parents reported on their age, marital status, household income, education level, and ethnicity.

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[1] Questionnaires for youth temperament and aggression are in Appendix D, and for parent temperament, personality and aggression in Appendix E.

Adolescent temperament. Temperament characteristics were assessed using the short form of the Early Adolescent Temperament Questionnaire Revised (EATQ; Capaldi & Rothbart, 1992; EATQ-R; Ellis & Rothbart, 2001). The self-report EATQ-R is a measurement instrument comprised of ten temperament and two behavioural scales to evaluate features of temperament related to self-regulation (65 items in total). Only five of the temperament scales were employed in this study and represent three of the four temperament dimensions (27 items in total). These included, effortful control (attentional, activation and inhibitory control scales; 6, 4, and 4 items, respectively), fear (6 items), and frustration (7 items). Representative survey questions were as follows: "It is easy for me to really concentrate on homework problems" measured attentional control capacity, "If I have a hard assignment to do, I get started right away" tapped into activation control, and "When someone tells me to stop doing something it is easy for me to stop" assessed inhibitory control levels. Questions on frustration included, " It really annoys me to wait in long lines". Last, the fear characteristic was determined through questions like "I get scared when I enter a darkened room at home". All questions were rated on a five-point scale ranging between "almost always true" to "almost always untrue". Parents reported on their adolescent's temperament with identical questions but from the parent's perspective to ask about the same three dimensions or five subscales (30 items in total; fear 6 items, frustration 6 items, attentional control 6 items, activation control 7 items, and inhibitory control 5 items) on the same five-point likert scale. A reliability analysis of the temperament dimensions revealed Cronbach's α ranging between .78 and .94, where youth responses were combined with both parents to give rise to a youth-mother-father (YMF) perspective (Table 4).

Table 4

Means, Standard Deviations, and Cronbach's Internal Consistency Values (α) for all Variables.

	Mean	Standard Deviation	α
Temperament			
Frustration	3.16	.50	.78
Fear	2.78	.55	.78
Effortful Control	3.49	.53	.94
Personality			
Mother			
Agreeableness	4.28	.45	.78
Conscientiousness	3.93	.58	.80
Emotional Stability	3.15	.80	.89
Father			
Agreeableness	3.85	.52	.80
Conscientiousness	3.76	.59	.80
Emotional Stability	3.40	.75	.88
Aggressive Subtypes			
Proactive-Overt	1.21	.31	.84
Proactive-Relational	1.27	.32	.83
Reactive-Overt	1.59	.47	.86
Reactive-Relational	1.72	.38	.74

Note. Temperament and aggression means were youth-mother-father composites while personality means were only from either mother or father scores.

Adolescent aggression. The adolescent participants responded to the short form of Little, Jones and colleagues' (2003) questionnaire (25 items) investigating the functions of aggression with respect to their form. This measurement system of aggression is composed of six subscales to differentiate between pure overt and pure relational (4 items each), reactive-overt and reactive-relational (4 items each), and last, proactive-overt and proactive-relational (5 and 4 items, respectively). Sample questions included "When I'm threatened by someone, I often threaten back" to determine reactive-overt aggression, and "I often threaten others to get what I want" for proactive-overt aggression. A statement such as " When I am upset with others, I often ignore or stop talking to them" taps into reactive-relational aggression, and "I often tell my friends to stop liking someone to get what I want", reflects proactive-relational aggression. The relevance of each statement was rated by the youth on a four-point scale ranging from "not at all true" to "completely true". To garner information from the parents, the same adolescent questions were modified to elicit parent responses on the adolescent's differentiated aggressive behaviour (total 25 items). As with temperament, youth and parent responses were combined and averaged to create an YMF score. Internal consistency for these four subscales ranged between .74 and .86 (Table 4).

Parent personality. Mother and father personality traits were assessed using a self-report 50-item International Personality Item Pool (IPIP) listing originating from Goldberg's (1992) inventory of five-factor markers (IPIP, http://ipip.ori.org/). This measure includes 10 items for each factor including, surgency or extraversion, agreeableness, conscientiousness, emotional stability, and intellect or imagination. Only

measures for emotional stability, agreeableness and conscientiousness were utilized in this study (total 30 items). An example of an item capturing emotional stability was "I get stressed out easily", whereas those identifying agreeableness incorporated "I am interested in people". Conscientiousness was measured with statements such as "I am always prepared". All responses were coded on a five-point scale ranging between "very inaccurate" to "very accurate". Internal consistency of the personality scales fell between .78 and .89 (Table 4).

Results

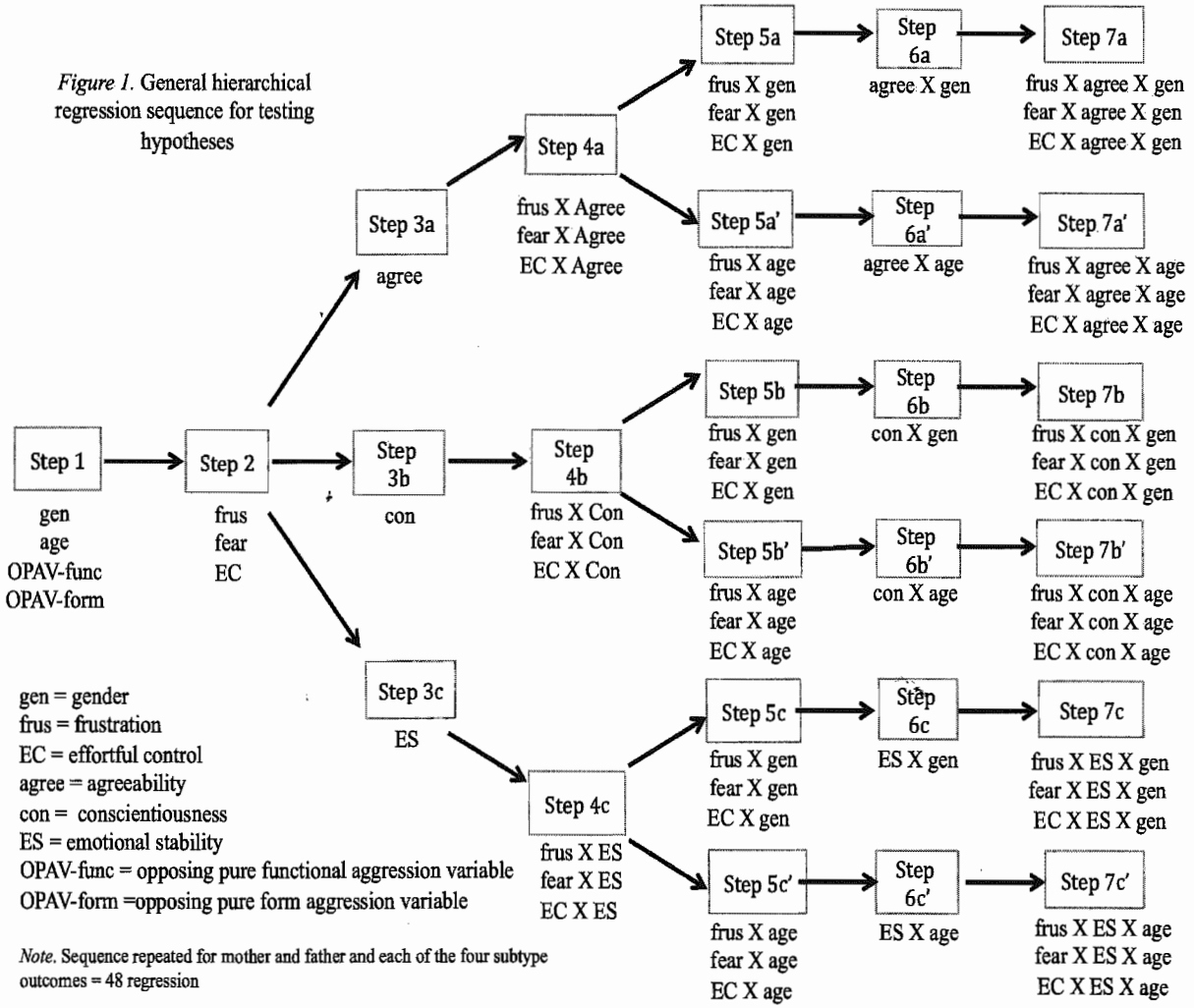
Plan of Analysis

Initially, the data were screened and then combined to represent three perspectives on adolescent aggressive behaviour by averaging the youth, mother and father (YMF) variable composite means into one for each temperament and aggression measure, except personality, which the parents self-reported. Composites were only computed when participants had responded to 50% of the items in the scale. This resulted in a combined YMF predictor variable being generated for frustration, fear, effortful control, and a combined criterion variable being generated for proactive-overt, proactive-relational, reactive-overt, and reactive-relational aggression. Individual predictors were calculated for the mother and father with respect to agreeableness, conscientiousness and emotional stability, based on their self-reports. Descriptive statistics on all these variables were examined for data accuracy, normality of distribution, skewness, kurtosis, linearity between predictor and criterion variables, redundancy or multicollinearity of predictor variables, and univariate outliers. Missing data at the item and variable level, as well as, reliability of the questionnaire scales were addressed. All predictor variables were centered, except for gender, to reduce multicollinearity between first-order and higher-order terms before entering them into the regression analysis (Cohen, Cohen, West & Aiken, 2003).

Hierarchical multiple regressions were run to test the three hypotheses. In general, the regression sequence followed normative procedures to include age, gender and opposing 'pure' form and function control variables in the first step, and then

temperament in step 2 followed by personality variables in step 3 (Figure 1). Two-way interactions between temperament or personality with age or gender were entered in step 4, 5, 6, and three-way interactions between temperament, personality and the covariates of age or gender in step 7. Each regression used YMF composite variables, except for mother and father personality, to predict variability in the four subtypes of aggression. Of particular note, 'pure' form and function control variables were entered alongside demographic variables in the first step to control for a 'general' aggression, which is thought to be the degree to which a person is inclined to intentionally hurt people through aggressive behaviour. For instance, when regressing *proactive-overt* aggression on demographic, temperament and personality variables, a 'pure' *reactive* and 'pure' *relational* variable were entered in the first step. 'Pure' form measures were measured directly using items that omitted any reference to reactive or proactive functions, instead stating "I'm the kind of person who" engages in a relational or overt act. However, the 'pure' function measures could not be derived from equivalent function-only questions. Instead, form/function questions (e.g., reactive-overt aggression) were regressed on the form alone (e.g., pure overt) and the residuals saved as a composite to represent a 'pure' functional variable (Card et al., 2003). Additional regressions were also conducted to verify whether any of the interactions were masking underlying curvilinear relationships between any predictor and the four criterion variables. As well, regression diagnositics were conducted to confirm that the assumptions for significance testing were not being violated: this included looking at homoscedasticity, independence of residuals, and the normality of residual distributions. Multivariate outliers were vetted through Cook D

Figure 1. General hierarchical regression sequence for testing hypotheses



gen = gender
frus = frustration
EC = effortful control
agree = agreeability
con = conscientiousness
ES = emotional stability
OPAV-func = opposing pure functional aggression variable
OPAV-form =opposing pure form aggression variable

Note. Sequence repeated for mother and father and each of the four subtype outcomes = 48 regression

values. Finally, a simple slopes analysis was conducted to determine which relationships within an identified significant interaction were different from a zero slope (Aiken & West, 1991). All statistical procedures were run on PASW 18.0 for Mac.

Preliminary Analysis

The data were screened for normality by viewing frequency plots and investigating skewness and kurtosis values. The predictors and criteria variables appeared normally distributed and under cutoff scores of 2 and 7 (West, Finch, & Curran, 1995), respectively, except for the proactive-overt and proactive-relational variables. Log10 transformations were performed on these two criteria and regressions rerun. The results did not change appreciably, and thus, untransformed proactive aggression variables were used. Univariate outliers were identified as z values greater than |3.29| (Tabachnick & Fidell, 2001) and only a very few were found close to the cutoff score, and therefore, left in the data set to maintain sample size and because there were no compelling theoretical reasons for excluding them. Multivariate outliers were detected through Cook D and none were greater than 1 (Cohen et al., 2003). Missing data was well under the recommended cutoff point of 3%, both at the item and variable level (Tabachnick & Fidell, 2001), thus, imputation of missing values by an expectation-maximization algorithm became unnecessary since means, standard deviations and correlations were not expected to be biased by missing data.

The aggression scores were on average higher for reactive than proactive subtypes. All reliability analyses indicated good consistency within each of the temperament, personality and aggression scales (Table 4; ranging from .74-.94).

Bivariate correlations showed weak associations between the temperament variables, although frustration and EC displayed negative relations with one another while frustration and fear showed positive relations with each other (Table 5)[2]. The temperament predictors were also weakly correlated with parent personality traits and the intercorrelations between the parent personality traits were weakly positive too. Thus, multicollinearity did not appear to be an issue between predictors and this was confirmed by high tolerance values in the regression analyses. However, temperament predictors were moderately correlated with the aggression subtypes; fear and EC negatively, and frustration positively. The parental personality traits, in contrast, were very weakly correlated with the aggression subtype criteria, as expected of a predictor that is only indirectly associated with the outcome. On the other hand, the aggression variables were all moderately to highly, and positively, correlated with one another, consistent with previous research (Fite et al., 2008; Murray-Close & Ostrov, 2009). This considerable overlap between the criteria was managed by controlling for a general aggression in the first step of each regression.

Hierarchical Regression Results

Regressions were run on the differentiated aggression outcomes and the results of these are presented below in four sections, each focused on data relating to only one of the four aggression subtypes (Figure 1). Within each section, first main effects are reported for both mother and father regressions since they are identical to this point,

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[2] Intercorrelations between *individual* youth, mother, and father temperament variables and intercorrelations between their aggression variables are in Appendices D and E, respectively.

Table 5

Intercorrelations Between Temperament, Personality and Aggression Subtype Variables.

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Frustration	---												
2. Fear	.24**	---											
3. Effortful Control	-.38**	-.03	---										
4. Agreeableness (m)	-.13**	.01	.15**	---									
5. Conscientiousness (m)	-.11*	-.07	.27**	.27**	---								
6. Emotional Stability (m)	-.26**	-.16**	.25**	.20**	.23**	---							
7. Agreeableness (f)	-.07	-.05	.12*	.12**	.13**	.10*	---						
8. Conscientiousness (f)	.05	.02	.21**	.11*	.18**	.08	.31**	---					
9. Emotional Stability (f)	-.21**	-.06	.21**	.14**	.14**	.05	.24**	.31**	---				
10. Proactive-Overt	.34**	-.15**	-.42**	-.05	-.15**	-.14**	.03	-.11*	-.15**	---			
11. Proactive-Relational	.35**	-.10*	-.46**	-.06	-.16**	-.14**	-.02	-.12**	-.15**	.81**	---		
12. Reactive-Overt	.34**	-.26**	-.44**	-.08	-.12*	-.10*	-.01	-.06	-.17**	.68**	.59**	---	
13. Reactive-Relational	.45**	.01	-.39**	-.08	-.12**	-.18**	-.01	-.02	-.13**	.57**	.71**	.58**	---

Note. All correlations involving temperament and/or aggression subtype variables used youth-mother-father composite means while those for personality variables came from only the father or mother; f = father, m = mother.

* $p < .05$ ** $p < .01$. (two-tailed)

followed by significant interaction effects between the main predictors and age or gender and their accompanying simple slopes analysis. Next, two way interactions between temperament and mother personality or three-way interactions between temperament, mother personality and age/gender are presented alongside any post hoc probing. Finally, the equivalent two- and three-way interaction results are reported from father regressions with any subsequent post hoc probing. If the significant main effects and interactions were not protected for type 1 errors by Fisher's protected t, they were excluded from interpretation. Those below the recommended sr^2 or effect size of .01 (1% variance) were also not analyzed (Cohen et al., 2003). Post hoc probing of significant interactions was done by creating new conditional moderator variables, where the zero point was manipulated to be one SD above or below the mean, and then analyzing the conditional effect on the relation between the predictor and outcome in follow up regressions (Holmbeck, 2002). These simultaneous runs included the predictor, either the one SD above or below moderator, the interaction term created from either the one SD above or below moderator and the predictor, and any covariates. The regression lines from the significant interaction were subsequently plotted. This was accomplished by calculating outcome values through post hoc regression equations using predictor values of one SD above and below the mean.

Proactive-overt aggression.

Main effects and their two-way interaction with age/gender. As shown in Table 6, both mother- and father-associated regressions displayed a significant accounting of variance by gender ($t(442) = -2.96$, $p < .001$), relational aggression ($t(442) = 20.49$,

Table 6

Summary of Significant Mother and Father Regression Results for Proactive-Overt Aggression Predicted by Adolescent Temperament, Personality, and Gender.

	Mother $N = 446$				Father $N = 447$			
	R^2	$R^2\ \Delta$	β	sr^2	R^2	$R^2\ \Delta$	β	sr^2
Step 1	.50***				.50***			
Gen			-.10**	.01			-.10**	.01
Age			.06	.00			.05	.00
Pure Reactive			.02	.00			.02	.00
Pure Relational			.66***	.48			.69***	.48
Step 2	.53***	.03			.53***	.03		
Frus			.11**	.01			.11**	.01
Fear			-.12**	.01			-.12**	.01
EC			-.11**	.01			-.11**	.01
Step 4c	.53	.00			.54**	.02		
Frus X ES			.00	.00			-.08*	.01
Fear X ES			.02	.00			.06*	.00
EC X ES			.06	.00			.08*	.01
Step 5a'	.54*	.01			.54*	.01		
Frus X Age			.01	.00			.02	.00
Fear X Age			-.05	.00			-.04	.00
EC X Age			-.10**	.01			-.09*	.01
Step 5b'	.54*	.01			.54*	.01		
Frus X Age			.02	.00			.02	.00
Fear X Age			-.04	.00			-.04	.00
EC X Age			-.09*	.01			-.09*	.01
Step 5c'	.54*	.01			.55	.01		
Frus X Age			.01	.00			.02	.00
Fear X Age			-.05	.00			-.04	.00
EC X Age			-.10**	.01			-.08*	.01
Step 7c	.54	.01			.55	.00		
Frus X ES X Gen			.09	.00			.10	.00
Fear X ES X Gen			-.12*	.01			.04	.00
EC X ES X Gen			.03	.00			.11	.00
Step 7b'	.54	.00			.55	.01		
Frus X Con X Age			-.01	.00			-.03	.00
Fear X Con X Age			-.02	.00			.08*	.01
EC X Con X Age			-.06	.00			.05	.00

Note. Con = conscientiousness, ES =emotional stability, Frus = frustration, EC = effortful control, Gen = gender; personality in path a = agreeableness, path b = conscientiousness, path c = emotional stability; pathways *without'* = with gender and *with'* = with age in the interactions.
* $p < .05$ ** $p < .01$ *** $p < .001$.

p <.001), frustration ($t(442) = 2.68, p = .01$), fear ($t(442) = -3.22, p < .001$), and EC ($t(442) = -2.90, p < .001$), where each was uniquely predictive.

Proactive-overt aggression was also predicted by a two-way interaction between EC and age, beyond each of the mothers' and fathers' personality traits.

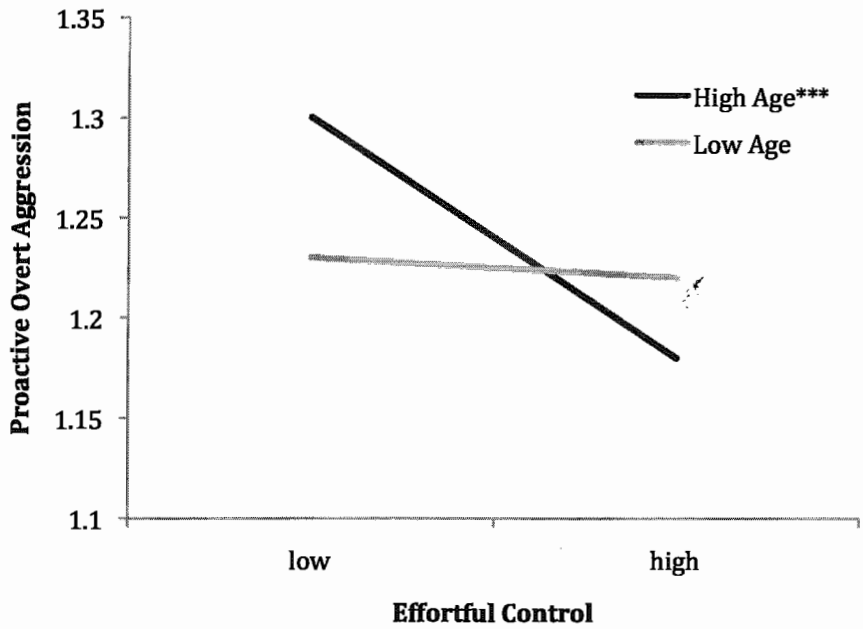
To facilitate interpretation of these interactions, simple slopes analyses were computed by running post hoc simultaneous regressions with two new manipulated age variables. The regression lines were subsequently graphed, as can be seen in Figure 2, to show that adolescents with low EC *only* aggressed through proactive-overt means when they were older ($\beta = -.20, sr^2 = .02, p < .001$, $\beta = -.20, sr^2 = .02, p < .001$, mother and father, respectively), and not when they were younger ($\beta = -.02, sr^2 = .00, p = .77$, $\beta = -.02, sr^2 = .00, p = .77$, mother and father, respectively).

Mother personality and temperament interactions. No two-way interactions between personality and temperament, or three-way interactions between personality, temperament, and age/gender were found to be significant.

Father personality and temperament interactions. The two-way interactions of frustration and father emotional stability ($t(435) = -2.06, p = .04$), and EC and father emotional stability ($t(435) = 2.02, p = .04$) uniquely predicted variance in proactive-overt aggression over and above the other variables in the model.

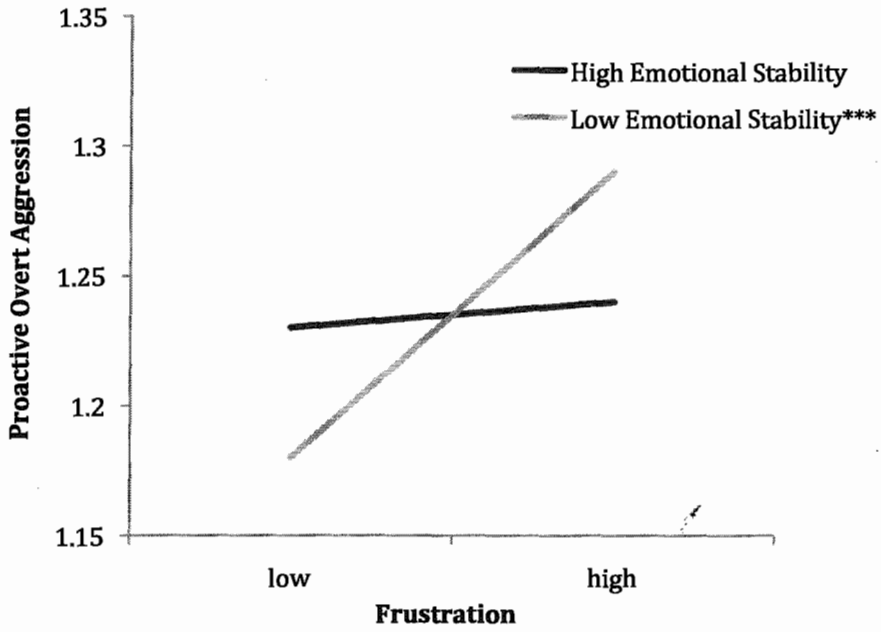
Post hoc testing of the two significant interactions and subsequent graphing indicated that the association between frustration and proactive-overt aggression was *only stronger* when fathers had lower emotional stability ($\beta = .19, sr^2 = .02, p < .001$), not at higher levels of emotional stability ($\beta = .024, sr^2 = .00, p = .63$), as illustrated in Figure 3.

Similarly, as shown in Figure 4, the negative relation of EC to proactive-overt aggression was *only strengthened* when father emotional stability was lower ($\beta = -.20$, $sr^2 = .02$, $p < .001$), not when it was higher ($\beta = -.01$, $sr^2 = .00$, $p = .91$).



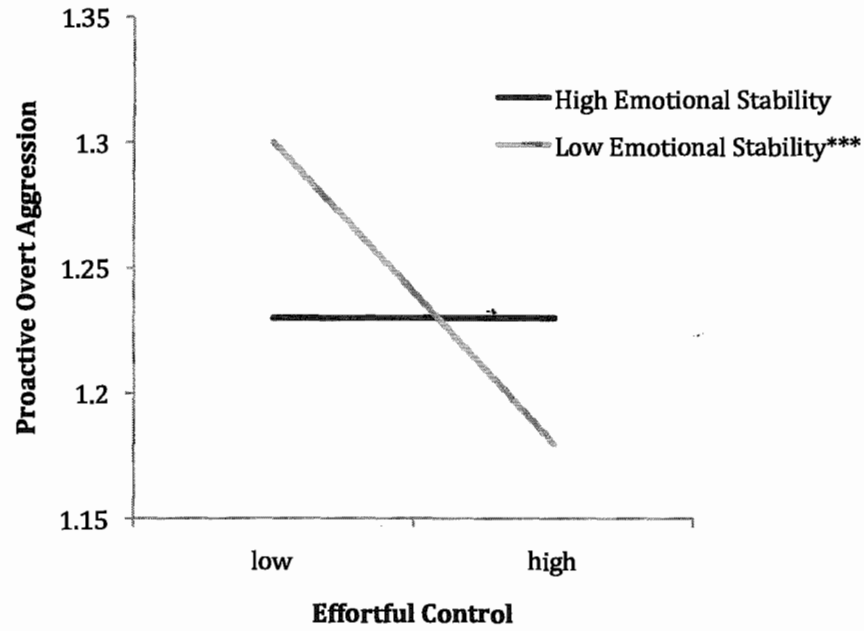
*** $p < .001$.

Figure 2. EC interacting with age to predict proactive-overt aggression in mother or father personality associated regressions.



***$p < .001$.

Figure 3. Frustration interacting with father emotional stability to predict proactive-overt aggression.



***$p < .001$.

Figure 4. Effortful control interacting with father emotional stability to predict proactive-overt aggression.

Proactive-relational aggression.

Main effects and their two-way interaction with age/gender. As seen in Table 7 for proactive-relational regression statistics, both overt aggression ($t(442) = 22.55, p < .001$) and EC ($t(442) = -3.44, p < .001$) accounted for unique variance in proactive-relational aggression over and above the other predictors in the model.

Subsequently, age was found to significantly moderate the relation between mother emotional stability and proactive-relational aggression ($t(429) = -3.42, p < .001$). The association between father emotional stability and proactive-relational was also moderated by age ($t(431) = 1.97, p = .50$).

Post hoc testing of the simple slopes, displayed in Figure 5, showed the association between mother's low emotional stability and proactive-relational aggression was *only stronger* in older adolescents ($\beta = -.14, sr^2 = .01, p < .001$), not younger ones ($\beta = .09, sr^2 = .00, p = .05$). Although the moderational effects of lower age in the previous interaction were significant, they were below the recommended effect size and not interpreted. None of the simple slopes were significant for the father two-way interaction between emotional stability and age.

Mother personality and temperament interactions. Temperament and personality two-way interactions of fear and agreeableness ($t(434) = 2.82, p = .01$), frustration and conscientiousness ($t(434) = 3.02, p = .01$), and EC and conscientiousness ($t(434) = 2.16, p = .03$), each accounted for unique variance in proactive-relational aggression over and above all the other predictors.

Table 7

Summary of Significant Regression Results for Proactive-Relational Aggression Predicted by Adolescent Temperament, Personality, and Gender.

	Mother $N = 446$				Father $N = 447$			
	R^2	$R^2\,\Delta$	β	sr^2	R^2	$R^2\,\Delta$	β	sr^2
Step 1	.54***				.54***			
Gen			.04	.00			.04	.00
Age			.07	.00			.01	.00
Pure Reactive			.04	.00			.04	.00
Pure Overt			.73***	.53			.73***	.53
Step 2	.56**	.02			.56**	.02		
Frus			.03	.00			.03	.01
Fear			-.01	.00			-.01	.00
EC			-.13**	.01			-.13**	.01
Step 4a	.57*	.01			.56	.00		
Frus X Agree			-.03	.00			.07	.00
Fear X Agree			.10**	.01			-.01	.00
EC X Agree			-.06	.00			-.01	.00
Step 4b	.57*	.01			.56	.00		
Frus X Con			.11**	.01			.06	.00
Fear X Con			-.01	.00			-.02	.00
EC X Con			.08*	.01			-.01	.00
Step 4c	.56*	.01			.56	.00		
Frus X ES			-.03	.00			.04	.00
Fear X ES			-.00	.00			.02	.00
EC X ES			.06	.00			.01	.00
Step 6c'	.58**	.01			.56*	.00		
ES X Age			-.12**	.01			.07*	.00
Step 7b'	.57	.01			.58*	.01		
Frus X Con X Age			.09	.01			.10*	.01
Fear X Con X Age			.02	.00			.07*	.00
EC X Con X Age			.01	.00			.11*	.01

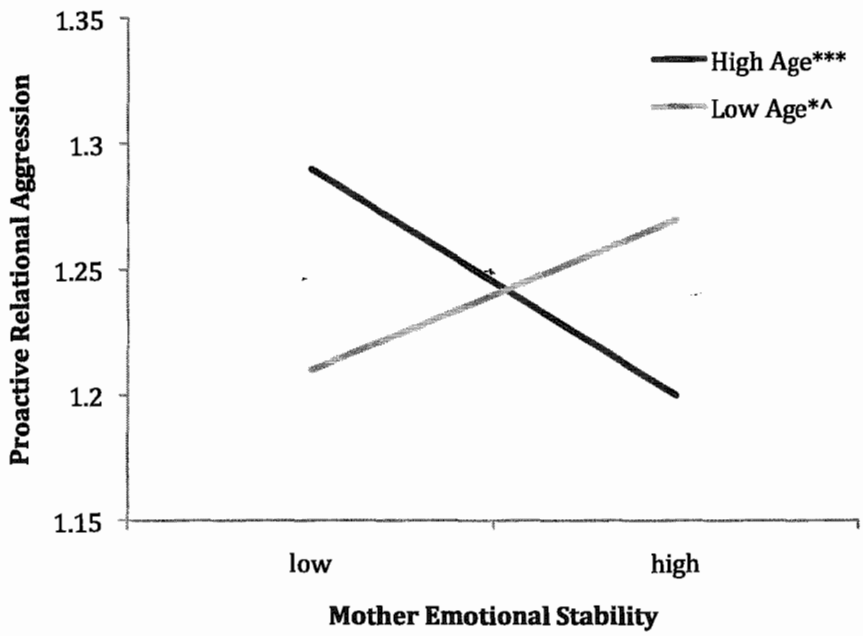
Note. Agree = agreeableness, Con = conscientiousness, ES =emotional stability, Frus = frustration, EC = effortful control, Gen = gender; personality in path a = agreeableness, path b = conscientiousness, path c = emotional stability; pathways *without'* = with gender and *with'* = with age in the interactions.
* $p < .05$ ** $p < .01$ *** $p < .001$.

All three, two-way interactions were probed through a simple slopes analysis to determine the nature of the relationship. After computation and graphing, the first analysis revealed that although the interaction between fear and mother agreeableness was significant, the effect size fell below the recommended threshold and no further interpretation was undertaken. As illustrated in Figure 6, the next analysis revealed the relation between lower EC and proactive-relational aggression was *only strengthened* when mothers had lower conscientiousness ($\beta = -.16$, $sr^2 = .01$, $p < .001$), not higher conscientiousness ($\beta = -.10$, $sr^2 = .00$, $p = .04$). Since the moderation effect of higher conscientiousness was below the recommended effect size, only the lower conscientiousness interaction was interpreted. Last, none of the simple slopes for the interaction between frustration and mother conscientiousness were found to be significant.

Father personality and temperament interactions. The association between each of the three temperament characteristics and proactive-relational aggression were moderated by both father conscientiousness and age ($t(428) = 2.36$, $p = .02$, $t(428) = 1.97$, $p = .05$, $t(428) = 2.45$, $p = .02$, frustration, fear and EC, respectively).

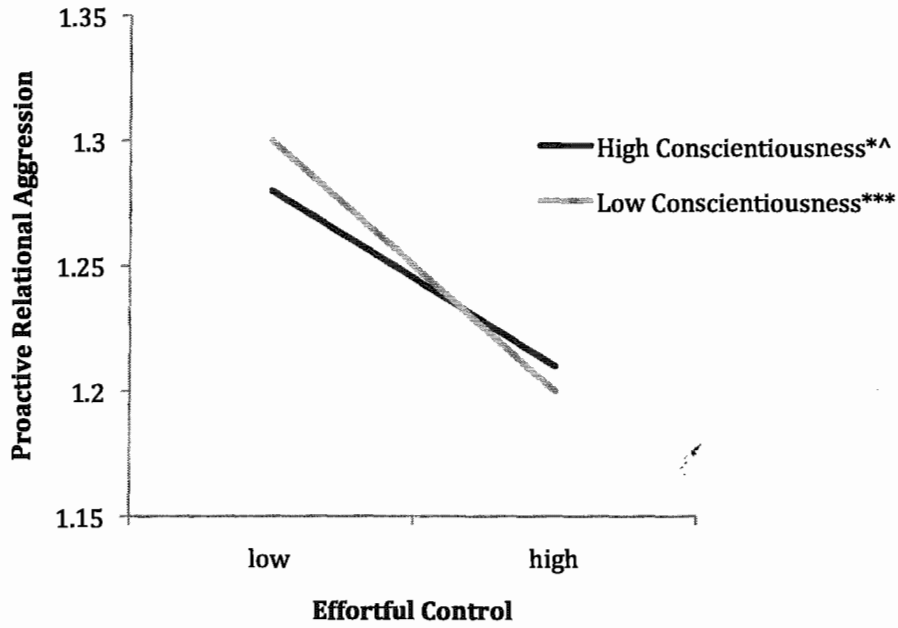
Post hoc regressions revealed only two of the three-way interactions had significant slopes; specifically both frustration and EC interacted significantly with father conscientiousness and age to predict unique variance in proactive-relational aggression. In the case of frustration, as depicted in Figure 7, the relation between higher frustration and proactive-relational aggression was *only stronger* when both father conscientiousness and adolescent age were higher ($\beta = -.14$, $sr^2 = .01$, $p = .01$), but not when father

conscientiousness was higher and adolescent age lower (β = .01, sr^2 = .00, p = .89), or when father conscientiousness was lower and adolescent age higher (β = -.04, sr^2 = .00, p = .56), or when father conscientiousness and adolescent age were both lower (β = -.02, sr^2 = .00, p = .77). With respect to EC as illustrated in Figure 8, the negative relation between EC and higher levels of proactive-relational aggression was *only strengthened* when fathers had higher levels of conscientiousness and adolescents were younger (β = -.19, sr^2 = .01, p = .01), not when fathers had higher levels of conscientiousness and adolescent were older (β = -.13, sr^2 = .00, p = .06), or when fathers had lower levels of conscientiousness and adolescents were older (β = -.10, sr^2 = .00, p = .14 , or when fathers had lower levels of conscientiousness and adolescents were younger (β = -.08, sr^2 = .00, p = .24).



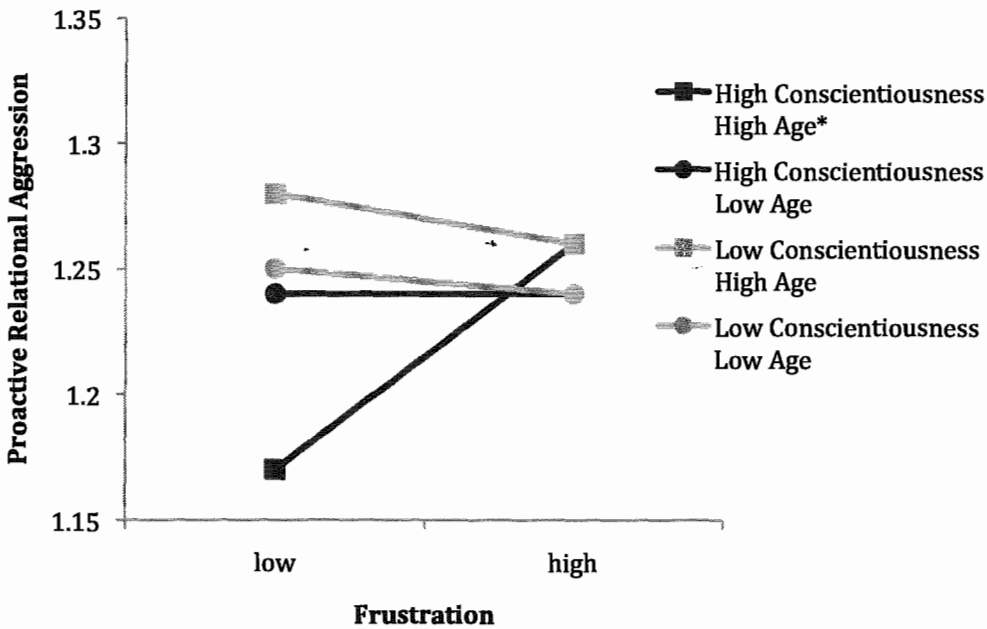
* p < .01. *** p < .001, ^ Effect size below threshold for interpretation

Figure 5. Mother emotional stability interacting with age to predict proactive-relational aggression.



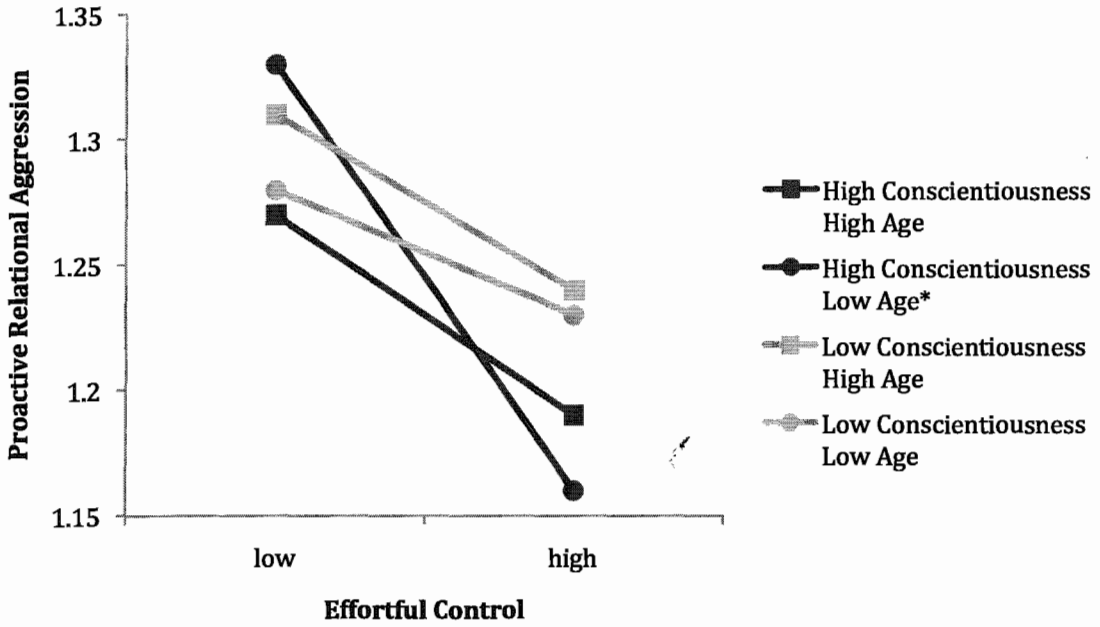
* $p < .05$ *** $p < .001$. ^ Effect size below threshold for interpretation

Figure 6. EC interacting with mother conscientiousness to predict proactive-relational aggression.



* $p < .05$.

Figure 7. Frustration interacting with father conscientiousness and age to predict proactive-relational aggression.



*$p < .05$.
Figure 8. EC interacting with father conscientiousness and age to predict proactive-relational aggression.

Reactive-overt aggression.

Main effects and their two-way interaction with age/gender. As can be seen in Table 8, there was unique variance in reactive-overt aggression attributable to gender ($t(444) = -6.65, p < .001$), relational aggression ($t(444) = 15.94, p < .001$), frustration ($t(444) = 4.55, p < .001$), fear ($t(444) = 5.95, p < .001$), and EC ($t(444) = -3.08, p < .001$), over and above the other predictors in the model.

Three main effects by age/gender interactions were identified as significant. First, the relation between mother emotional stability and reactive-overt aggression was moderated by age ($t(431) = 2.41, p = .02$). Second, the interaction between father emotional stability and gender accounted for unique variance in reactive-overt aggression

Table 8

Summary of Significant Regression Results for Reactive-Overt-Aggression Predicted by Adolescent Temperament, Personality, and Gender

	Mother $N = 448$				Father $N = 449$			
	R^2	$R^2\,\Delta$	β	sr^2	R^2	$R^2\,\Delta$	β	sr^2
Step 1	.42***				.42***			
Gen			-.24***	.06			-.24***	.06
Age			.07	.01			.07	.01
Pure Proactive			.07	.00			.07*	.01
Pure Relational			.58***	.33			.58***	.33
Step 2	.50***	.08			.49***	.08		
Frus			.18***	.02			.18***	.02
Fear			-.22***	.04			-.22***	.04
EC			-.15***	.02			-.15***	.02
Step 4a	.50	.01			.50	.00		
Frus X Agree			-.04	.00			-.01	.00
Fear X Agree			.01	.00			-.01	.00
EC X Agree			-.10*	.01			.03	.00
Step 6c	.50	.00			.51*	.01		
ES X Gen			-.03	.00			.12*	.01
Step 6a'	.51	.00			.51*	.01		
Agree X Age			.00	.00			.09*	.01
Step 6c'	.51*	.01			.51	.00		
ES X Age			.09*	.01			-.02	.00
Step 7a	.52*	.01			.51	.00		
Frus X Agree X Gen			-.07	.00			.02	.00
Fear X Agree X Gen			.10	.00			-.04	.00
EC X Agree X Gen			.10	.00			-.04	.00
Step 7a'	.52*	.01			.51	.00		
Frus X Agree X Age			-.01	.00			.00	.00
Fear X Agree X Age			-.04	.00			.05	.00
EC X Agree X Age			-.11*	.01			.00	.00
Step 7b'	.51	.01			.51*	.01		
Frus X Con X Age			-.05	.00			-.12**	.01
Fear X Con X Age			-.07	.00			-.04	.00
EC X Con X Age			-.08	.00			-.06	.00
Step 7c'	.51	.00			.51	.01		
Frus X ES X Age			.03	.00			-.06	.00
Fear X ES X Age			.00	.00			.08*	.01
EC X ES X Age			.06	.00			-.03	.00

Note. Agree = agreeableness, Con = conscientiousness, ES =emotional stability, Frus = frustration, EC = effortful control, Gen = gender; personality in path a = agreeableness, path b = conscientiousness, path c = emotional stability; pathways *without'* = with gender and *with'* = with age in the interactions.
* $p < .05$ ** $p < .01$ *** $p < .001$.

($t(433) = 2.01, p = .04$). Last, the association between father agreeableness and reactive-overt aggression was moderated by age, accounting for unique variance in overt-aggression over and above the other predictors in the model ($t(433) = 2.50, p = .01$).

Simple slopes analysis and graphing of these post hoc results showed that two of the three interactions had significant slopes. In Figure 9, the association between mother emotional stability and reactive-overt aggression was *only stronger* with older adolescents ($\beta = .13, sr^2 = .01, p = .02$), not younger adolescents ($\beta = -.05, sr^2 = .00, p = .26$). As illustrated in Figure 10, the relation between father lower emotional stability and reactive-overt aggression was *only stronger* with males ($\beta = -.15, sr^2 = .01, p = .01$), not females ($\beta = .02, sr^2 = .00, p = .68$). Although the simple slopes analysis was significant for the interaction between father agreeableness and age, the effect size did not reach the threshold recommended for interpretation by Cohen and colleagues (2003).

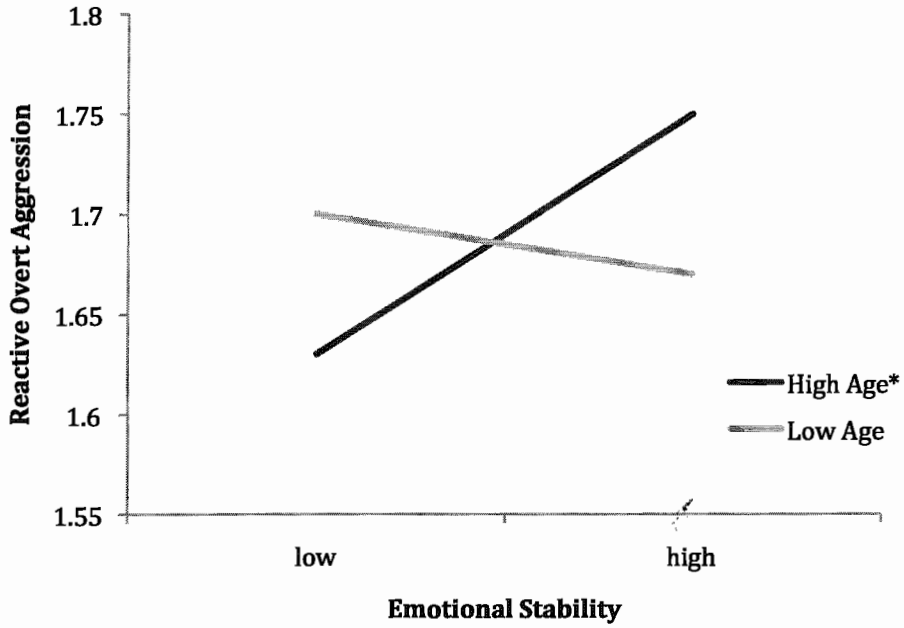
Mother personality and temperament interactions. A three-way interaction between EC, mother agreeableness and age accounted for unique variance in reactive-overt aggression while other predictors in the model were kept constant ($t(429) = -2.46, p = .01$).

As shown in Figure 11, post hoc probing and subsequent graphing revealed lower EC was *more strongly* related to reactive-overt aggression when mothers were more agreeable and adolescents were older ($\beta = -.32, sr^2 = .02, p < .001$), as opposed to when mothers were less agreeable and adolescents younger ($\beta = -.19, sr^2 = .01, p = .01$), or when mothers were high in agreeableness and adolescents were younger ($\beta = -.16, sr^2 = .01, p = .02$), or if mothers were low in agreeableness and adolescents were older ($\beta =$

-.01, $sr^2 = .00$, $p = 88$). It was noted that at higher ages there was a difference of significance, whereas at lower ages there was only a difference in magnitude, which was underscored by a greater difference in the effect size value between the higher age conditions of low and high conscientiousness.

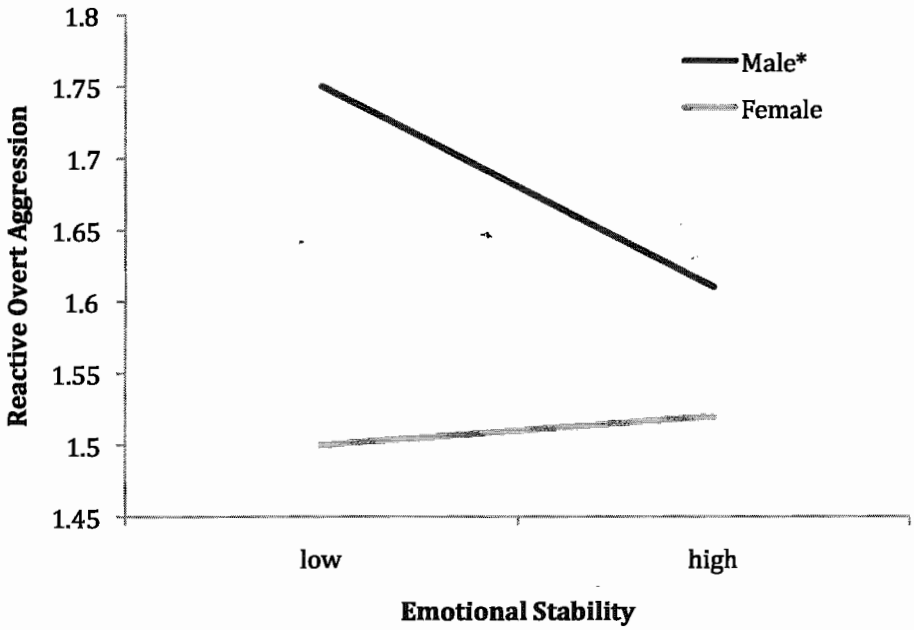
Father personality and temperament interactions. There was unique variance in reactive-overt aggression predicted by a three-way interaction between frustration, father conscientiousness and age ($t(430) = -2.7$, $p = .01$).

A simple slopes analysis was graphed, see Figure 12, which showed frustration was *more strongly* associated with reactive-overt aggression when fathers had high conscientiousness and younger adolescents ($\beta = .27$, $sr^2 = .02$, $p < .001$), as opposed to fathers with low conscientiousness and older adolescents ($\beta = .25$, $sr^2 = .02$, $p < .001$), compared to fathers with low conscientiousness and younger adolescents ($\beta = .17$, $sr^2 = .01$, $p = .01$), or fathers with high conscientiousness and older adolescents ($\beta = .09$, $sr^2 = .01$, $p = .15$). Again, older adolescents differed by significance, whereas younger adolescents differed by magnitude, but in this case, younger and older adolescents had the same effect size value between their low and high conscientiousness conditions.



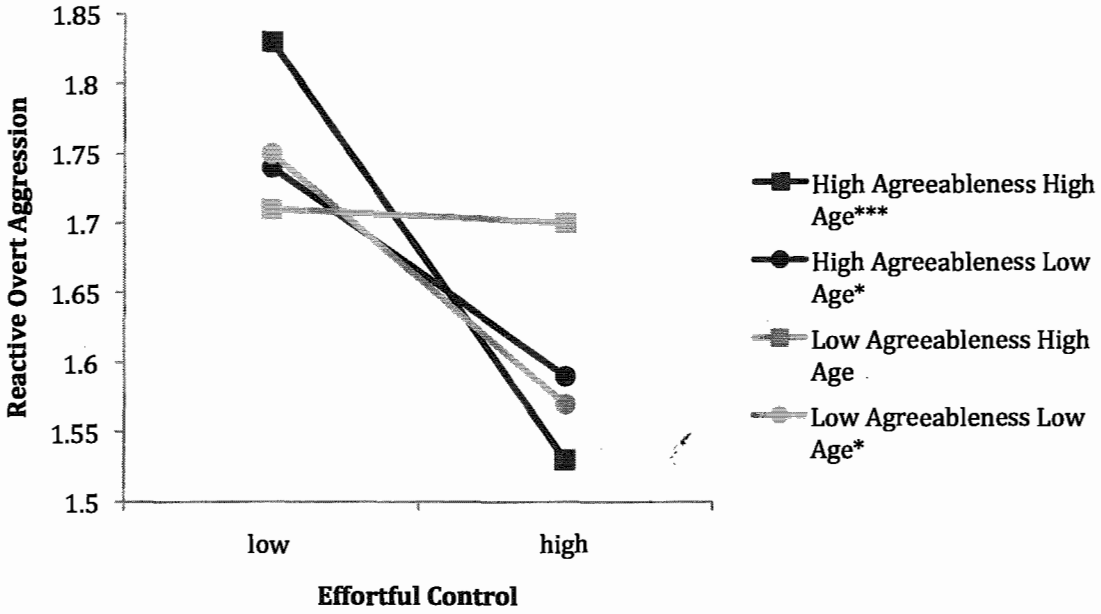
*$p < .05$.

Figure 9. Mother emotional stability interacting with age to predict reactive-overt aggression.



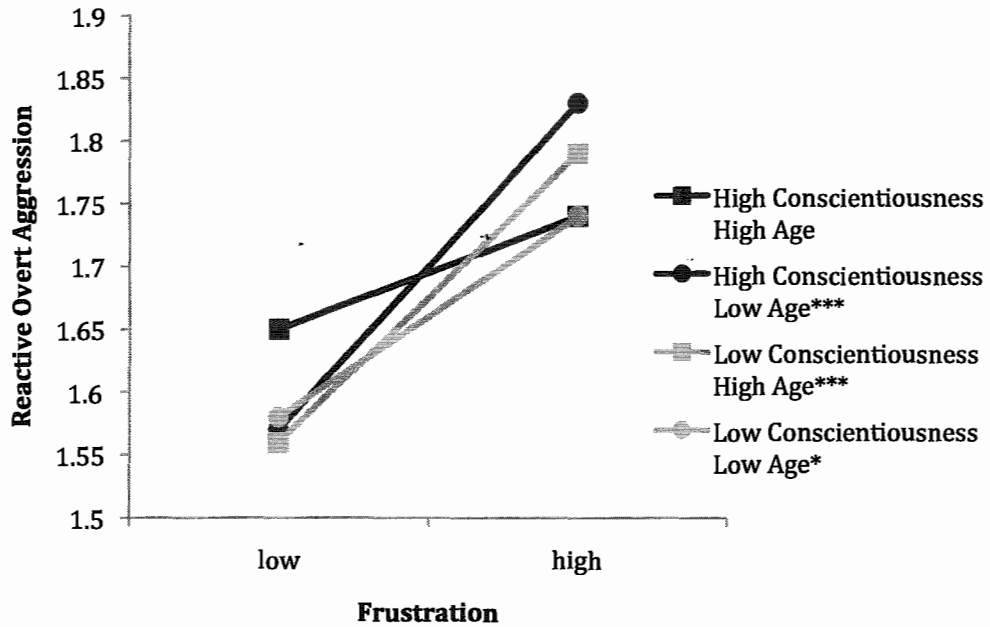
* $p < .01$.

Figure 10. Father emotional stability interacting with gender to predict reactive-overt aggression.



*$p < .05$ *** $p < .001$.

Figure 11. EC interacting with mother agreeableness and age to predict reactive-overt aggression.



* $p < .01$ *** $p < .001$.

Figure 12. Frustration interacting with father conscientiousness and age to predict reactive-overt aggression.

Reactive-relational aggression.

Main effects and their two-way interaction with age/gender. As shown in Table 9, gender ($t(442) = 2.87, p = .01$), overt aggression ($t(442) = 16.79, p < .001$), and frustration ($t(442) = 4.84, p < .001$) each accounted for unique variance over and above the other predictors in the model.

There were no significant interactions between any of the main effects and age/gender.

Mother personality and temperament interactions. There were no significant two-way interactions between personality and temperament, or three-way interactions between personality, temperament, and age/gender predicting reactive-relational aggression.

Father personality and temperament interactions. Additional variance in reactive-relational aggression was uniquely accounted for by two interactions. One was between frustration and father agreeableness ($t(435) = 2.73, p = .01$), and the other was between EC and father agreeableness ($t(435) = 2.70, p = .01$).

Graphing after a simple slopes analysis, see Figure 13, revealed high frustration was *more strongly* related with reactive-relational aggression when fathers had higher agreeableness ($\beta = .26, sr^2 = .03, p < .001$), as opposed to lower father agreeableness ($\beta = .15$ $sr^2 = .01, p = .01$). Next, as shown in Figure 14, the association between low EC and reactive-relational aggression was *only strengthened* for fathers with lower agreeableness

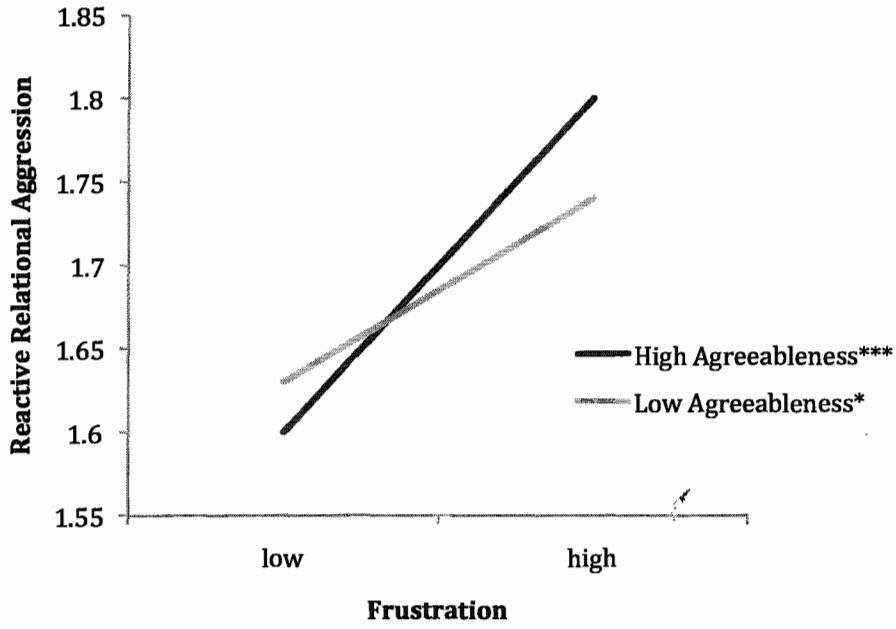
(β = -.14, sr^2 = .01, p = .01), not for those with higher agreeableness (β = -.02, sr^2 = .00, p = .78).

Table 9

Summary of Significant Regression Results for Reactive-Relational Aggression Predicted by Adolescent Temperament, Personality, and Gender

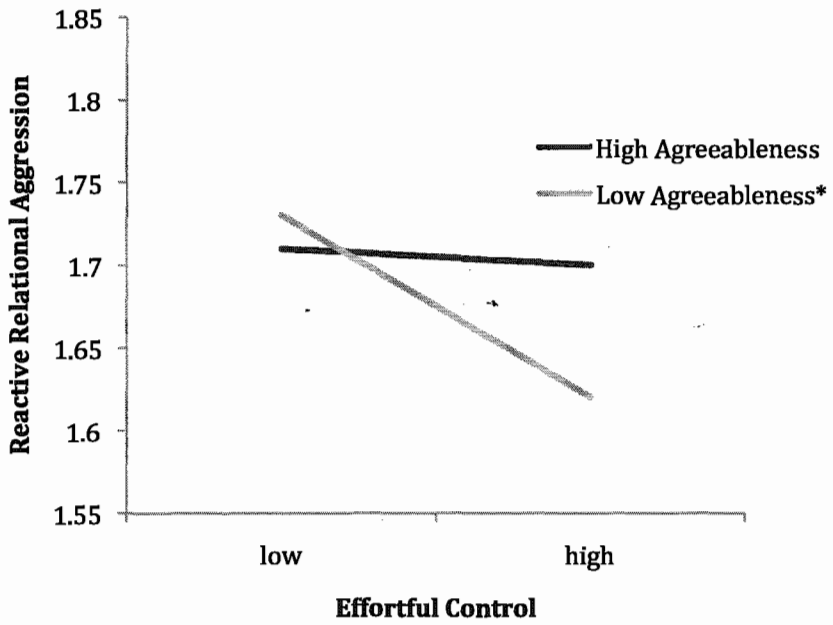
	Mother $N = 446$				Father $N = 447$			
	R^2	R^2 Δ	β	sr^2	R^2	R^2 Δ	β	sr^2
Step 1	.40***				.40***			
Gen			.11**	.01			.11**	.01
Age			-.02	.00			-.02	.00
Pure Proactive			.02	.00			.02	.00
Pure Overt			.63***	.38			.63***	.38
Step 2	.45***	.05			.45***	.05		
Frus			.21***	.03			.21***	.03
Fear			.01	.00			.01	.00
EC			-.07	.00			-.07	.00
Step 4a	.45	.01			.46*	.01		
Frus X Agree			.02	.00			.11**	.01
Fear X Agree			.06	.00			-.01	.00
EC X Agree			-.02	.00			.11**	.01

Note. Agree = agreeableness, Frus = frustration, EC = effortful control, Gen = gender; personality in path a = agreeableness, path b = conscientiousness, path c = emotional stability; pathways *without'* = with gender and *with'* = with age in the interactions.
* $p < .05$ ** $p < .01$ *** $p < .001$.



* $p < .05$ *** $p < .001$

Figure 13. Frustration interacting with father agreeableness to predict reactive-relational aggression.



* $p < .05$

Figure 14. Effortful control interacting with father agreeableness to predict reactive-relational aggression.

Discussion

General Findings

The main aim of this research was to examine whether temperament vulnerabilities and a poor fit between temperament and parent personality differentially predicted the four subtypes of aggressive behaviour. The results suggested there was support for both hypotheses. In the first instance, temperament characteristics did distinguish between the subtypes, indicating that different characteristics underlie the processes involved in the development of differentiated aggression. For example, both overt subtypes were uniquely predicted by lower fear.

In reference to the second hypothesis, lower levels of parent personality traits did moderate the association between adolescent temperament and differentiated aggression. For instance, the association between low EC and reactive-overt aggression was stronger when the mother had lower levels of agreeableness. As predicted, when the fit was poor, there was a stronger relationship between temperament vulnerabilities and aggressive subtype behaviour. Moreover, this was found for both mother and father personality traits. Unexpectedly, the results also showed that a poor fit could involve higher levels of personality traits, which had been expected to be more optimal. For instance, higher levels of father agreeableness strengthened the relationship between higher frustration and reactive-relational aggression.

Contrary to hypothesized relations, gender did not play a moderational role between a poor fit (i.e., between adolescent temperament vulnerabilities and non-optimal parent personality traits) and the specific aggressive subtypes. This suggested that

adolescent males and females did not differ with respect to the association between temperament risk factors and the four aggression subtypes. That is to say, although the main effect results supported males being more overtly aggressive than females, as is consistent with the literature (Côté, 2009), overt aggression appeared to be predicted by identical factors in males and females. For example, being easily frustrated could make both genders more likely to aggress in a reactive-overt fashion. Similar gender related factors also held for proactive-relational aggression, where a significant main effect indicated females were more likely than males to display this subtype of aggression, but associated temperamental vulnerabilities were the same for both genders.

Despite the results being only partially consistent with the hypotheses, overall they indicated that both temperament vulnerabilities and a poor fit with parent personality are likely important to understanding the processes leading to differentiated aggression. Major findings will be discussed further under three sections: first temperament associations, then temperament-personality interactions predicting subtype behaviour, and finally, mother-father differences.

Temperament Vulnerabilities Predicting Aggression Subtypes

Findings consistent with previous research. Compatible with the first hypothesis, lower levels of fear predicted proactive-overt aggression, higher levels of frustration were associated with the reactive-relational subtype, and higher levels of frustration and lower levels of EC predicted reactive-overt aggressive behaviour. This was consistent with previous studies that associated the temperament correlates of angry reactivity and emotional disregulation with reactive aggression and CU traits with

proactive aggression (Nigg, 2006; Vitaro, Barker, et al., 2006, Xu et al., 2009). CU traits are thought to encompass a more severe reduction in affect, but are similar to the characteristics of lower emotional reactivity or a lack of fear studied in this research. Consistent with the second hypothesis, higher levels of overt aggression were related to being male and paralleled the literature in which the overt form is more commonly associated with this gender (Card et al., 2008).

Findings inconsistent with previous research.

Fear. Expanding on the first hypothesis, there was evidence to suggest that temperament correlates could distinguish between the forms of aggression. Of particular interest was the association between lower levels of fear and reactive-overt aggression. This was contradictory to previous research that defined reactive aggression as a fearful response to perceived threat (Hubbard, 2010; Vitaro & Brendgen, 2005). However, it may be that reactive overt aggression involves alternate processes that link to lower fear or reactive responses. Cima & Raine (2009) support this idea by suggesting that those individuals who have lower levels of fear or weak reactive control are more likely to fight back than flee when confronted, especially in association with sensation seeking traits or surgency. Moreover, this idea is corroborated by evidence from the bullying literature, where both overt subtypes are related to the characteristic of low fear (Terranova et al., 2008).

As a result of reactive control processes being implicated in withdrawal/approach behaviour, higher levels of fear are thought to serve as a brake against involvement in the overt forms of aggression. Conversely, lower levels of fear may serve to facilitate overt

aggression that is believed to have a lower effect-danger ratio, where possible gains are weighed positively against the higher probability of physical injury, and/or being identified as the perpetrator and subject to retaliation (Bjorkqvist, 1994; Warren, Richardson, & McQuillin, 2011). Given the lower level of danger associated with relational aggression, fear characteristics, and hence reactive control processes, are less likely to be involved in inhibiting indirect aggressive tendencies.

Evolutionary perspectives also support the assertion that overt forms of aggression are a more risky, dangerous, type of behaviour. With the higher probability of exposure to physical injury, females are less likely to engage in overt aggression in the pursuit of survival for themselves and their offspring. Instead, less direct measures are thought to net the desired high status male and accompanying resources, particularly in intrasexual competition (Campbell, 1999; Vaillancourt, 2005). From this viewpoint, relational forms of aggression are not as likely to be associated with low levels of fear. In contrast, males invest less in their offspring and compete for status and resources in more risky overt aggressive behaviours. This evolutionary approach to understanding the forms of aggressive behaviour also aligns with the literature where overt aggression is perceived as a male dominated domain (Bjorkqvist, 1994; Card et al., 2008).

Frustration. Another unforeseen finding was the association of proactive-overt aggression with higher levels of frustration, even when controlling for reactive aggression. This result was not consistent with past research that has separated reactive and proactive aggression based on emotionality (Cima & Raine, 2009; Hubbard, 2010; Nigg, 2006; Vitaro & Brendgen, 2005). On the one hand, reactive aggression has been

conceptually related to the anger-frustration theory of aggression, where individuals are thought to respond in angry frustration to actual or perceived provocation, especially when their goals are blocked (Berkowitz, 1993). On the other hand, proactive aggression has been explained by the social learning theories of aggression, where goal-driven individuals are conditioned to aggress callously in the pursuit of a desired reward (Hubbard et al., 2010). However, the results from this research suggest there must be some frustration proneness in those who aggress proactively, and that the two functions of aggression might not be quite as distinct with respect to emotionality as originally thought. To explain this finding, at least in part, it may be instructive to recall that all subtypes of aggression, including those with proactive and reactive functions, have at their root a tendency to participate in behaviour that has the intent of hurting someone (Dodge et al., 2006). Given that all forms and functions of aggression have this basic purpose, it may not be surprising that adolescents with a temperamental predisposition toward frustration and anger are more likely to engage in both reactive and proactive subtypes of aggression. Furthermore, when the primary goal of proactive-overt aggression is to inflict pain and hurt the victim without explicit or contemporaneous provocation, as opposed to being a means to an instrumental or relational outcome (e.g., to take lunch money; to become popular), it may have a sadistic quality. This attribute would seem to involve negative emotionality, or frustration proneness, as suggested by our results.

Effortful control. Surprisingly, lower EC was found to be associated with both proactive subtypes of aggression despite the prevailing point of view that deficits in EC are more characteristic of reactive aggression (Frick and Morris, 2004; Nigg, 2006; Vitaro

et al., 2002). Individuals aggressing proactively are more frequently thought to have deficits in fearful inhibition or reactive control (Eisenberg, Spinrad, & Eggum, 2010; Kochanska & Aksan, 2006). Having said that, the current finding is consistent with some previous research in which both subtypes of reactive and proactive aggression have been linked with low EC (de Castro et al., 2005, Xu et al., 2009). Furthermore, given that proactive aggression is defined as goal directed and reward driven behaviour, de Castro and colleagues (2005) have speculated that this association with low EC might be qualitatively different between the functional subtypes. They propose that while reactive aggression is associated with the inability to inhibit angry responses, proactive aggression is probably related to the inability to inhibit behaviour that satisfies the need for good feelings, those gained through rewarding aggressive acts.

Summary. Several points became apparent after interpretation of the findings from this study. The first is that the overt forms of aggression were distinct from relational forms with respect to temperament. Fear characteristics distinguished overt from relational. This expands on Card and colleagues (2008) conclusion that gender and maladjustment outcomes differentiate between the forms. Second, the functions of aggression were not as distinct with respect to the characteristics of frustration and EC as expected. Reconsideration and further study of these two traits may discern qualitative differences within each characteristic.

Temperament-Personality Interactions Predict Aggression Subtypes

Consistent findings. Congruent with the third hypothesis, some results supported the proposition that adolescents with temperamental vulnerabilities toward aggressive

behaviour would be at greater risk when paired with a parent whose personality traits were non-optimal, as characterized by low levels of emotional stability, conscientiousness and agreeableness. For example, results showed the relation between higher frustration and reactive-overt aggression was strengthened when a father displayed *lower conscientiousness*, both in younger and older adolescents. This finding was consistent with the expectation that an adolescent who had higher levels of frustration would be at greater risk with a parent who had trouble self-regulating, one modeling poorly regulated behaviour, or lacking the discipline, commitment or skills to help the child control and surmount emotional distress.

Another interaction that conformed to expectations revealed that the relation between lower EC or frustration and reactive-relational aggression was stronger when a father exhibited *lower agreeableness*. As expected, an adolescent with poor behavioural control would be less likely than peers to inhibit aggressive behaviour when they felt threatened or provoked. Nevertheless, perhaps this would be even more pronounced with a father prone to irritability or other negative emotionality, resulting in the modeling of poor emotion regulation and contributing to a stressful family environment. In this case, the poor fit or incompatibility between the father and adolescent could lie partly in a poorly regulated child having difficulty inhibiting negative emotions evoked by a disagreeable father. This in turn could create a surplus of negative emotionality and stress in the family environment, and in accordance with the frustration-aggression theory (Berkowitz, 1993), increase the likelihood of a reactive aggressive response, in this instance, in the relational form. There was also evidence to suggest this scenario would likely arise with respect to the mother as well. The relation between low EC and reactive

overt aggression was strengthened when mothers exhibited *lower agreeableness*, particularly in younger adolescents. However, in this circumstance the reactive aggressive response was in the overt form.

All three of these results were consistent with previous research that associated lower levels of parent personality, both reactive and regulatory aspects, with the development of undifferentiated aggressive behaviour. For example, Heaven and colleagues (2004) reported that fathers with lower conscientious or higher anxiety (NA) were predictive of adolescent delinquency. Another study linked lower parent EC with child externalizing problems through a double mediation process, first through family chaos and then low child EC (Valiente et al, 2007). Furthermore, our results were compatible with the work of Rettew and colleagues (2006), where they found a poor fit between child temperament and parent personality was associated with higher levels of externalizing behaviour. However, their poor fit involved lower child novelty seeking (i.e., PA) and higher mother harm avoidance (i.e., behavioural inhibition), not the higher levels of novelty seeking or surgency conventionally associated with aggressive behaviour (Marsee & Frick, 2007, Nigg, 2006, Xu et al., 2009). Our results extend this work by providing evidence for a poor fit to include previously known vulnerabilities in the child associated with aggressive behaviour, and involve a variety of regulatory and/or reactive traits on the part of both the parent and child. In addition, our evidence suggests the fit between adolescent temperament and parent personality is important to differentiated aggressive outcomes. Last, these findings fall in line with personality research that associates traits with maladaptive outcomes, where lower levels of agreeableness and conscientiousness may lead to a myriad of problems, including higher

white-collar criminality (Ragatz & Fremouw, 2010), aggressive and ASB (Miller, Lynam, & Jones, 2008), and poorer parenting (Oliver et al, 2009; Prinzie et al., 2009; Trentacosta & Shaw, 2008). The inference is a parent with lower levels of personality traits could model not only poor emotion regulation but perhaps aggressive and antisocial behaviour as well.

Supportive findings. Results were found that aligned with the third hypothesis except not with respect to the specific subtypes that were originally proposed. In the first instance, the association between higher frustration or lower EC and proactive-overt aggression was stronger when fathers were *lower in emotional stability*, a surprising observation since proactive aggression has not generally been linked to emotionality or reactivity in previous research (Hubbard et al., 2010; Nigg 2006, Vitaro et al., 2002; Xu et al., 2009). It had been assumed beforehand that parent emotional instability would interact with frustration tendencies and poor self-regulation abilities in the prediction of reactive aggression, a behaviour thought to be more emotional in nature. However, alongside the evidence of a significant main effects association between frustration and proactive-overt aggression, this poor fit further suggests there might be alternative processes at work in the development of proactive aggression. For example, evidence from personality research indicates neurotic parents (i.e., parents low in emotional stability) are more likely to respond to daily stresses in their life with maladaptive parenting practices (Bornstein, Hahn, & Haynes, 2011). In reaction, perhaps emotionally vulnerable youth (i.e., those high in frustration proneness, low in EC) have difficulty coping with a stressful family environment that originates from a father's emotional

instability. Furthermore, although the frustration-aggression theory (Berkowitz, 1993) hypothesizes that an accumulation of negative affect would predispose adolescents to engage primarily in reactive aggression, proactive-overt aggression, like all aggression, is enacted with the intent to hurt someone, in some cases sadistically (see above). Consequently, parent and child factors that increase the experience of negative affect may also play a role in the emergence of 'emotionally-driven' proactive subtypes of aggression. If a father continually provokes and incites negative affect in a temperamentally vulnerable adolescent, a subsequent act of proactive-overt aggression on a peer could reflect a form of displaced aggression, where the response is acted out on an innocent bystander instead of on the initial and more powerful provocateur (Miller, Pedersen, Earleywine, & Pollock, 2003).

A second finding also supported the general prediction that temperament predispositions to differentiated aggression would be moderated by a parent's lower level of personality traits, but associated with an unexpected subtype. Specifically, the relation between low EC and proactive-relational aggression was strengthened when mothers displayed *lower conscientiousness*, a result that was predicted to pertain to reactive subtypes of aggression, given their association with self-regulation deficits (Hubbard et al., 2010, Nigg, 2006). Despite the unanticipated association between adolescent low EC and proactive aggression, it was expected that a mother demonstrating poor control over her own behaviour would present as a poor role model for her own child in regard to self-regulation. As well, the mother would likely have little capacity or interest in aiding the adolescent to regulate inappropriate or aggressive behaviour. Indeed, as de Castro and colleagues (2005) have suggested it may be that youth are vulnerable to proactive

subtypes of aggression when they have difficulty self-regulating positive affect resulting from the rewarding aspects of this goal-directed behaviour.

Inconsistent findings. A surprising turn of events was to find evidence that higher levels of parent personality traits that are usually associated with positive behavioural outcomes contribute to a poor fit between temperament and personality. In several significant interactions, temperamental vulnerabilities were more strongly linked to differentiated aggression when parents possessed these nominally positive personality characteristics. For example, the association between high frustration or low EC and proactive-relational aggression was stronger when the father had *higher levels of conscientiousness*. As before, emotionality and low EC were not anticipated to be associated with proactive aggression, but even more unexpected was that higher levels of conscientiousness in the father strengthened this relation. However, it is possible that an overly conscientious parent might be exacting in their demands, highly focused on the details of their child's lifestyle, or always prepared to rectify any straying from parental expectations. Adolescents could perceive constant parent directives as intrusive and aversive, especially when temperament renders them emotionally vulnerable. As well, this type of parent could find a reactive or poorly regulated child annoying and difficult to understand, which in turn could initiate conflict between the dyad, and further serve as a catalyst for aggression. Neitzel and Stright (2004) support these contentions with evidence that highly conscientious parents as compared to parents with less conscientiousness tend to be over-controlling and more rejecting during problem solving

interactions with their child if they perceived the child to be temperamentally difficult (e.g., poor attention and inhibitory control, negative emotional responses).

A second set of goodness of fit interactions involved higher levels of agreeableness predicting greater levels of reactive aggression. In the first instance, the relation between low EC and reactive-overt aggression was strengthened when a mother displayed *increased agreeableness*, in both younger and older adolescents. In the second instance, an association between high frustration and reactive-relational aggression was stronger when the father had *higher levels of agreeableness*. Congruent with the original prediction, reactive aggression was related to lower EC and higher frustrative characteristics, but not in conjunction with the more agreeable personality traits of the parent. Nevertheless, perhaps an unusually agreeable parent does not perceive aggression as a problem or chooses not to discipline the behaviour. As well, maybe these parents are too permissive at a time when self-determination is a priority in an adolescent's life, and a lack of guidance might easily lead to unchecked aggressive behaviour. Within the relaxed atmosphere of the home, an adolescent could act with impunity despite their obviously unpleasant aggressive behaviour. In addition, the overly positive parent might overcompensate for the aggressive behaviour by excusing it rather then employing the necessary discipline or guidance to prevent it from continuing. Jensen-Campbell and colleagues (2011) underscore this line of thought by stating that although agreeableness is important to successful parenting behaviour, it becomes detrimental without accompanying high levels of control. Furthermore, they state permissive or indulgent parenting is associated with adverse effects on the child, such as the development of poor

peer relationships, disrespectful attitudes towards others, and deficits in control, all behavioural manifestations of reactive aggression.

Summary. The results from this research suggest that the idea of goodness of fit between an adolescent's temperament characteristics and a parent's personality traits is important to the development of the various subtypes of aggressive behaviour. As predicted, lower levels of personality traits, such as agreeableness, conscientiousness, and emotional stability, strengthened the relation between temperament vulnerabilities and aggressive subtype behaviour in some cases. These results are consistent with the research of Rettew et al. (2006) to show goodness of fit is important to developmental outcomes. Our work also adds to the existing literature. First, it reveals that *both* the reactive and regulatory systems participate in the poor fit between an adolescent and their parent. Second, it suggests that different patterns of incompatibility between temperament and personality lead to the same aggressive subtype outcome, supporting the concept of equifinality. As a result, there are likely multiple pathways to any one subtype of aggressive behaviour. Finally, there is evidence to support the involvement of both mother and father personalities as moderators of the relationship between adolescent temperament vulnerabilities and differentiated aggression.

The results also expanded on the proposed hypothesis to suggest that a poor fit could involve more optimal aspects of a parent's personality. This is contrary to the literature where positive traits have been primarily linked to less, not more, ASB (Rettew et al., 2006; Valiente et al., 2007). In one study, for example, higher levels of EC in the parent were mediated through positive parent reactions to give rise to lower levels of

externalizing behaviour (Valiente et al., 2007). In a second study, high father persistence was found to moderate the relation between high adolescent EC and lower externalizing problems (Rettew et al., 2006). However, perhaps the difference between results lies in the type of model tested, moderational *versus* mediational, or in the measures used to analyze personality, that is, conscientiousness in this study instead of EC or persistence. Alternatively, perhaps the difference is a result of using differentiated aggressive outcomes and controlling for a common general aggression tendency in the first step of the regression analysis. Regardless, our research implicates traits at the higher and lower ends of the dimension as part of the goodness of fit model explored in relation to aggressive subtype behaviour.

Mother and Father Differences

Both mother and father personality traits were found to be involved in a poor fit with vulnerable temperament characteristics that linked to greater levels of differentiated aggression. Moreover, father personality was found to contribute to many of the significant findings. It supported the contention that fathers have a role to play in the development of differentiated aggressive behaviour. Furthermore, it emphasized the importance of including them in family research especially since their influence has been largely ignored until the last part of the 20th century (Hoeve, Dubas, Eichelsheim, van der Laan, Smeenk, Gerris, 2009; Pleck, 2010).

Of particular interest was the result that only father lower emotional stability played a role in the poor fit prediction of aggression subtypes. This finding fell in line with other studies that have detected differences between the genders in the expression of

emotion, particularly anger. For instance, men were found to differ from women by expressing their anger explosively as a control strategy and through other-directed aggression (Campbell & Muncer, 2008; Sadeh, Javdani, Finy, & Verona, 2011). As well, within the family context, children were more emotionally responsive to father anger than mother anger (Cummings, Goeke-Morey, Papp, & Dukewich, 2002), and father emotional unavailability was also a more consistent predictor of child externalizing and internalizing problems than mother's emotional unavailability (Goeke-Morey & Cummings, 2007). It supports the idea that aspects of father emotional stability, or anger tendencies, manifest in the modeling of poor anger management and contribute to an overall stressful family environment. Consequently, father emotional stability may be more strongly related to adolescent aggression.

Although research over the last three decades has determined that fathering is important to the development of the child, and our results support this, the influence has been noted as more similar than dissimilar to the mother's influence on psychological adjustment and behavioural outcomes (Lamb, 2010). In addition, being male has less to do with the fathering role than individual characteristics and the relationship the father develops with the child *and* mother (Lamb, 2010). It raises the question whether incompatibility between father personality, mother personality, and child temperament together would better predict differentiated aggressive behaviour. Investigations along these lines might unravel interrelated family effects, where any negative relationship, role modeling, and ultimately unfavourable parenting, might arise from group personality dynamics.

Limitations and Strengths

While the results were helpful in furthering our understanding of factors associated with differentiated aggression, some caution should be taken in their interpretation. First, the data used were cross sectional in nature and limited any causal implications. As well, the direction of effects was unclear, since the display of differentiated aggressive behaviour could reciprocally influence the interplay between adolescent temperament and parent personality. Second, whereas multiple respondents rated temperament and aggression, parent personality was self-reported and subject to a social desirability bias that could result in overly positive responses, or fewer negative responses, which biases the data. Third, the community sample used in this research came from a relatively homogeneous group and these results may not be generalizable to individuals with different ethnicities or cultural contexts. Fourth, the effect sizes for significant interactions were generally small and this may be due in part to the low levels of aggression reported (Table 4). Use of a clinical sample might improve this issue, and thus, establish relations not as easily detected in a community-based sample.

Importantly, there were several strengths to this study. First, each regression analysis included a control in the first step to account for the general aggression that the four subtypes of aggression were expected to share. This strategy was devised to address a concern expressed in the literature that the functions and/or forms of aggression are moderately to highly intercorrelated (Card & Little, 2006; Card et al., 2008; Hubbard et al., 2010; Little, Henrich et al., 2003). It was hoped that our statistical procedure would minimize any common variance and generate purer subtype outcomes. In fact, it seemed that controlling for the opposing subtypes made it possible to detect the association

between distinctive temperament profiles, and incompatibilities between temperament and personality, with the specific form/function of each subtype independent of any general aggression tendencies. A second strength of this study was the use of three informants for the composite scores of all predictors and criteria, except personality. It was anticipated that multiple informants would give a more balanced perspective and reduce the bias of any one informant (Achenbach, McConaughy, & Howell, 1987; Kurdek, 2003). In particular, including fathers was thought to add a new perspective that previously has been understudied (Parke, 2004). In fact, this research showed evidence for unique contributions from fathers and suggests they, and perhaps all types of parent figures, such as in lesbian and gay couples, should be included in future work. Last, the use of aggressive subtypes (i.e., proactive-overt) as outcomes was related to its applicability to clinical practice, where aggression in the population is displayed as a function embedded in a form. Very few groups study aggression from this perspective.

Future Directions and Implications

Several avenues of research should be pursued. The first involves a continued study of the main effects of temperament and their relation to aggressive subtype behaviour, particularly with respect to the dimension of affiliation. Ellis and Rothbart (2001) have identified this characteristic as one of four dimensions that together define early adolescent temperament. More importantly, they suggest affiliation only consolidates as a distinct factor during early adolescence. Although its origins from infancy and childhood are debatable, recent thought leans toward associating affliative characteristics with negative emotions, that is, higher levels of tendencies rooted in the

capacity to empathize, most especially with emotions of distress (Nigg, 2006). This last observation intersects well with studies on the functions of aggression, where only proactive types of behaviour have been closely associated with higher levels of CU, or lack of empathy. As a distinct factor associated with the adolescent developmental period, affiliation is hypothesized to differentiate between the functions of aggression, proactive-overt and reactive-overt subtype behaviour, in this age group. If a composite vulnerable temperament profile could be tagged with the development of a particular subtype outcome, perhaps preventative or treatment programs could be targeted to address underlying maladaptive characteristics and not only the behaviour.

A second avenue of research might be to investigate the mechanism of how parent personality alters the relation between temperament and aggression. Belsky's parenting process model suggests that parenting is a function of three domains of which the characteristics of the child and psychological resources of the parent are two determinants (Belsky, 1984). Thus, it would be of interest to discern whether non-optimal parent traits give rise to non-authoritative parenting styles, which in turn would increase the risk of developing aggression in temperamentally vulnerable adolescents. For instance, in this research, the relation between frustration and reactive-relational aggression was strengthened when fathers had higher levels of agreeableness. The question arises whether permissive parenting practices mediate this relationship. This would expand our understanding of the mechanisms leading to differentiated aggression and specifically target them with preventative and treatment measures that address fundamental causes. In this case, reactive-relational aggression may stem from permissive parenting, and therefore clinical assessment of parent personality and adolescent temperament in tandem

would provide information for a remedial program to be developed that fit this particular situation.

Last, the results from this research were taken within a cross sectional design, which by definition involves collecting data at a single time point. It limits any attempt to understand causal processes. Thus, future studies would benefit from collecting data at different time points such that it would be possible to better understand developmental pathways that ultimately inform clinical practice.

Conclusions

This research has contributed new information to our understanding of the correlates associated with aggressive subtype behaviour. First, the idea of four subtypes was supported by evidence of specific temperament associations. Most particularly, fear differentiated between the forms of aggression and proactive subtypes were surprisingly associated with reactive temperament traits. Next, a poor fit between adolescent temperament and parent personality was found to uniquely predict the different subtypes. This poor fit involved traits at the higher and lower end of the parent personality scale. As well, a variety of reactive and regulatory characteristic/trait combinations were part of a poor fit and suggested there are many pathways to the development of any one aggressive subtype. Finally, both father and mother personalities contributed to the prediction of the differentiated aggressive outcomes and this emphasized the importance of including both parents in research that studies the development of this maladaptive behaviour.

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Appendix A

Aggression Terminology

Depending on the focus of research, *undifferentiated* aggressive behaviour underlies a number of different concepts with quite different definitional boundaries. ASB, for instance, includes such acts as vandalism, physical and verbal aggression, theft, sexual assault, bullying, or even lying and noncompliance with adults (Loeber & Schmaling, 1985). Given the comorbidity of *undifferentiated* aggression alongside most forms of ASB, it is suggested that aggressive acts should fall under the broader class of ASB, not withstanding the distinction of intent to harm that defines only aggression (Dodge et al., 2006). Calling into question the past unitary research approach to understanding ASB, a meta-analysis of many factor-analytical studies yields two orthogonal dimensions of behaviour, covert to overt and low to high destructiveness (Dodge et al., 2006; Frick, Lahey, Loeber, Tannenbaum, Van Horn, Christ, et al., 1993; Loeber & Schmaling, 1985). In frequent usage today, covert aggression refers to behaviours entailing stealing, lying, or fire setting, while overt aggression alludes to acts of fighting, assault, and murder. The term delinquency is a legal one used by lawyers and criminologists to describe property (i.e., vandalism), person (i.e., murder) or status (i.e., drugs) offenses (Tremblay, 2003). Its function is strictly linked with legal matters, not developmental ones, and places it as a subclass of both aggressive behaviours and ASB. Oppositional Defiance Disorder (ODD) and Conduct Disorder (CD) are both used by psychologists and psychiatrists to identify problem behaviours within a clinical setting. ODD is characterized by consistently disobedient or disrespectful behaviour and irritable

moods. It is thought of as a precursor to CD, a more severe psychological disorder, which is exemplified by ongoing aggression, destruction of property, deceitfulness or serious violation of rules that often results in maladaptive outcomes (McMahon & Frick, 2005; Tremblay, 2003). These disorders also fall conceptually under the umbrella terms of *undifferentiated* aggression and ASB, and are comprised of both overt and covert behaviour. Externalizing and internalizing behaviours are two categories of conduct captured by the Child Behavior Checklist (CBCL) questionnaire to report on social competencies and problem behaviours (Achenbach, 1978; Achenbach & Edelbrock, 1979). Externalizing behaviours, specifically, are seen as outward acting behaviours that involve aggression, delinquency, and hyperactivity, again overlapping with the previous aggression terms (Liu, 2004). A last important categorization places aggression and ASB in the context of development. A taxonomy developed by Moffitt (1993) differentiates ASB based on when individuals engage in this type of behaviour. A small group of life-course persistent individuals are antisocial at every stage of development, while a larger group of adolescent-limited individuals display ASB only during this period. These two categories of ASB are believed to have unique causal risk factors and etiologies (Moffitt, 2003). Thus, it becomes readily apparent that the study of *undifferentiated* aggressive behaviour is complicated by a surfeit of constructs that are not conceptually distinct from one another. Moreover, the research on these behaviours is confounded by operationalization of overlapping constructs. In the last few years, a newly formed paradigm of aggression subtypes modifies the definition of aggressive behaviour and shifts attention to individual differences in its development instead of simply defining and enumerating the behaviour.

Appendix B

Social Development Model

This overarching model combines different aspects of the social control/bond theory, the social learning theory, and the differential association theory to explain the onset, progression and establishment of prosocial behaviour or ASB (Brown, Catalano, Fleming, Haggerty, Abbott, Cortes, et al., 2005; Catalano & Hawkins, 1996). The control theory incorporates three elements as essential to the formation of a social bond with conventional society, without which the individual is likely to develop ASB. The three constituent parts are sequential in that first, there must be an *attachment* to socializing units, namely parent, peer, school and community, through involvement or interactions with these agents. Next, there is a *commitment* to the conventional activities occurring in these socializing domains. Finally, an *acceptance* and *adoption* of the legal order found and promulgated within these systems. Ultimately, at the end of the process, there is the formation of a social bond to conventional society. The social learning theory identifies the means through which this bond is created, either learned through positive and prosocial reinforcement or alternatively not learned through negative or antisocial reinforcement. Last, is the differential association theory, which distinguishes between prosocial and antisocial associations as the pivotal determinant between developing prosocial or ASB. The proposed mechanism by which these two behaviours arise is essentially the same except one has an increasing, and the other a decreasing, likelihood of antisocial behaviour developing based on the process of socialization.

Appendix C

Temperament *versus* Psychopathology Concepts

As relatively distinct areas of research, temperament and psychopathology are often assessed with respect to one another since they conceptually overlap to a contentious degree (Frick, 2004; Lahey, 2004). This connection is envisioned to exist in a number of ways, namely, temperament could exist as a precursor to later developing psychopathology (vulnerability model), psychopathology could fall at the extremes of the temperament continuum (spectrum model), the process of psychopathology might be altered by temperament (pathoplastic effect), or temperament by psychopathology (scar effect; Caspi & Shiner, 2006; Nigg, 2006). A meta-analysis of current research suggests there is preliminary support for both the vulnerability and spectrum models (Tackett, 2006). While debate persists over which model best describes the relationship or whether temperament/personality and psychopathology are even distinctive concepts, there is enough evidence to suggest they are not redundant disciplines with respect to one another (Lahey, 2004; Muris & Ollendick, 2005). Moreover, integrated investigations will likely be advantageous in elucidating how they dovetail to explain different behavioural outcomes (Frick, 2004). To this end, some research continues to link temperament traits to specific disorders including *undifferentiated* and *differentiated* aggressive behaviour (Dodge et al., 2006).

Appendix D

Youth Survey[3]

Demographic Questionnaire

PART A	**Let's begin with some information about you.**

1. How old are you? _____ years old
2. Are you male or female?
   Male __ Female __
3. What grade are you in? Grade: _____
4. Who do you live with the most?

With my mother and my father __	With my father and his partner__	With a foster family __
With my mother and my stepfather __	With my father only __	Other: _____
With my father and my stepmother __	With my mother only __	No one __
With my mother and her partner		

5. How many brothers and sisters do you have? (include half-brothers and half-sisters)
_____ Brothers _____ Sisters

[3] Only part A, E, Q of the youth survey were used in this research. Those questions used for temperament or aggression composite variables have been starred (*) within each part.

Temperament Questionnaire

PART E	**How "true" is each statement for you?**

	Almost Always Untrue	**Usually Untrue**	**Sometimes True, Sometimes Untrue**	**Usually True**	**Almost Always True**
1. It is easy for me to really concentrate on homework problems.*					
2. I want to be able to share my private thoughts with someone else.					
3. When someone tells me to stop doing something it is easy for me to stop.*					
4. I feel shy about meeting new people.					
5. I do something fun for a while before starting my homework, even when I'm not supposed to.*					
6. I wouldn't like living in a really big city, even if it was safe.					
7. It bothers me when I try to make a phone call and the line is busy.*					
8. The more I try to stop myself from doing something I shouldn't, the more likely I am to do it.*					
9. Skiing fast down a steep slope sounds scary to me.					
10. I enjoy hugging people who I like.					
11. If I have a hard assignment to do, I get started right away.*					
12. I get frightened riding with a person who likes to speed.*					

	Almost Always Untrue	Usually Untrue	Sometimes True, Sometimes Untrue	Usually True	Almost Always True
13. I find it hard to shift gears when I go from one class to another at school.*					
14. I worry about my family when I'm not with them.*					
15. I get very upset if I want to do something and my parent(s) won't let me.*					
16. When trying to study, I have difficulty tuning out background noise and concentrating.*					
17. I finish my homework before the due date.*					
18. I will do most anything to help someone I care about.					
19. I worry about getting into trouble.*					
20. I am good at keeping track of several different things that are happening around me.*					
21. I would not be afraid to try a risky sport, like deep sea diving.					
22. It's easy for me to keep a secret.*					
23. It is important to me to have close relationships with other people.					
24. I am shy.					
25. Some kids/teens, who push people and throw their stuff around, make me nervous.*					

	Almost Always Untrue	Usually Untrue	Sometimes True, Sometimes Untrue	Usually True	Almost Always True
26. I get irritated when I have to stop doing something that I am enjoying.*					
27. I wouldn't be afraid to try something like mountain climbing.					
28. I put off working on projects until right before they're due.*					
29. I worry about my parent(s) dying or leaving me.*					
30. I enjoy going places where there are big crowds and lots of excitement.					
31. I am not shy.					
32. I am quite a warm and friendly person.					
33. It really annoys me to wait in long lines.*					
34. I feel scared when I enter a darkened room at home.*					
35. I pay close attention when someone tells me how to do something.*					
36. I get very frustrated when I make a mistake in my school work.*					
37. I tend to get in the middle of one thing, then go off and do something else.*					
38. It frustrates me if people interrupt me when I'm talking.*					

	Almost Always Untrue	Usually Untrue	Sometimes True, Sometimes Untrue	Usually True	Almost Always True
39. I can stick with my plans and goals.*					
40. I get upset if I'm not able to do a task really well.*					

Aggression Questionnaire

PART Q	**How TRUE is each statement for you?**			
	Not at all True	**Hardly Ever True**	**Somewhat True**	**Completely True**
1. I'm the kind of person who often fights with others.*				
2. If others have hurt me, I often keep them from being in my group of friends.*				
3. I often threaten others to get what I want.*				
4. I'm the kind of person who tells my friends to stop liking someone.*				
5. I'm the kind of person who ignores others or stops talking to others.*				
6. I often tell my friends to stop liking someone to get what I want.*				
7. I'm the kind of person who hits, kicks, or punches others.*				
8. When I'm threatened by someone, I often threaten back.*				
9. I often hit, kick, or punch others to get what I want.*				
10. I'm the kind of person who keeps others from being in my group of friends.*				
11. When I'm hurt by someone, I often fight back.*				
12. I often keep others from being in my group of friends to get what I want.*				
13. I'm the kind of person who says mean things to others.*				
14. If others have angered me, I often hit, kick or punch them.*				
15. To get what I want, I often put others down.*				

	Not at all True	Hardly Ever True	Somewhat True	Completely True
16. If others upset or hurt me, I often tell my friends to stop liking them.*				
17. When I am upset with others, I often ignore or stop talking to them.*				
18. To get what I want, I often gossip or spread rumours about others.*				
19. I'm the kind of person who puts others down.*				
20. If others make me mad or upset, I often hurt them.*				
21. To get what I want, I often say mean things to others.*				
22. I'm the kind of person who gossips or spreads rumors.*				
23. I overreact angrily to accidents.				
24. To get what I want, I often ignore or stop talking to others.*				
25. To get what I want, I often hurt others.*				
26. When I am teased or threatened, I get angry easily and strike back.				
27. I blame others in fights.				
28. When I am mad at others, I often gossip or spread rumours about them.*				
29. I use physical force in order to dominate other kids/teens.				
30. I get others to gang up on a peer.				
31. I threaten to bully others.				

Appendix E

Parent Survey[4]

Demographic Questionnaire

PART A	**Let's begin with some information about you and your child who is completing the youth survey.**

1. What is your relationship to the child who is completing the youth survey? (i.e., mother, stepfather, etc.) Please specify: _____
2. How often does the child completing the survey live in your household (i.e., always, weekends, holidays, etc.)? Please specify: _____
3. What grade is the child completing the survey in?
   Grade: _____
4. Is the child completing the survey a boy or a girl?
   Boy __ Girl __
5. How old is the child completing the survey? _____ years old.
6. How many other children do you have? ____
7. Who resides in your household (i.e., father, stepmother, 2 children...)?
   Please specify: _____
8. What is your age? ____ years old.
9. What is your marital status?
   Single __ Never Married __ Common-law/Living Together __ Widowed __
   Married __ Re-married __ Divorced __ or Separated __ Other: _____
10. Other than Canadian, is there another ethnic or cultural group(s) that your family belongs to?
    No __ Yes __ **If YES please specify:** _____
11. What languages are spoken in your home? _____
12. Where were you born? _____
13. What is the highest level of education that you have completed?
    Primary __ Elementary __ High School __ College __ University __ Master's Degree __
    Doctoral Degree __
14. What is your main occupation?
    Employed Full-time __ Unemployed or Looking for Work __ Retired __
    Employed Part-time __ Student __ Stay at Home Parent __ Other:_____
15. What was your total household income, before taxes, last year (from all persons in your household)?
    Under $20,000 __ $20,000-30,000 __ $30,000-40,000 __ $40,000-50,000 __
    $50,000-60,000 __ $60,000-70,000 __ $70,000-80,000 __ $80,000-90,000 __
    $100,000-120,000 __ More than $120,000 __

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[4] Only part A, G, H, K of the parent survey were used in this research. Those questions used for temperament, personality or aggression composite variables have been starred (*) within each part.

Temperament Questionnaire

PART G	**Please answer the following statements with reference to YOUR CHILD who is completing the youth survey. How true is this statement for him/her?**

	Almost Always Untrue	**Usually Untrue**	**Sometimes True, Sometimes Untrue**	**Usually True**	**Almost Always True**
1. Worries about getting into trouble.*					
2. Has a hard time finishing things on time.*					
3. Thinks travelling to Africa or India would be exciting and fun.					
4. If having a problem with someone, usually tries to deal with it right away.*					
5. Likes taking care of other people.					
6. Has a hard time waiting his/her turn to speak when excited.*					
7. Opens presents before he/she is suppose to.*					
8. Would be frightened by the thought of skiing fast down a steep slope.					
9. Usually does something fun for a while before starting his/her homework, even though he/she is not suppose to.*					
10. Likes to be able to share his/her private thoughts with someone else.					
11. Finds it easy to really concentrate on a problem.*					
12. Thinks it would be exciting to move to a new city.					
13. When asked to do something, does it right away, even if he/she doesn't want to.*					

	Almost Always Untrue	Usually Untrue	Sometimes True, Sometimes Untrue	Usually True	Almost Always True
14. Is annoyed by little things other kids do.*					
15. Would like to be able to spend time with a good friend every day.					
16. Gets very irritated when someone criticizes him/her.*					
17. When interrupted or distracted, forgets what he/she is about to say.*					
18. Is more likely to do something he/she shouldn't do the more he/she tries to stop himself/herself.*					
19. Can generally think of something to say, even with strangers.					
20. Enjoys exchanging hugs with people he/she likes.					
21. Wouldn't be afraid to try a risky sport like deep sea diving.					
22. Expresses a desire to travel to exotic places when he/she hears about them.					
23. Worries about our family when he/she is not with us.*					
24. Gets irritated when I will not take him/her places when he/she wants to go.*					
25. Wants to have close relationships with other people.					
26. Would like to drive a racing car.					
27. Has a difficult time tuning out background noise and concentrating when trying to study.*					
28. Usually finishes his/her homework before it's due.*					

	Almost Always Untrue	Usually Untrue	Sometimes True, Sometimes Untrue	Usually True	Almost Always True
29. Likes it when something exciting and different happens at school.					
30. Is quite a warm and friendly person.					
31. Usually gets started right away on difficult assignments.*					
32. Is good at keeping track of several different things that are happening around him/her.*					
33. Is energized by being in large crowds of people.					
34. Is shy.					
35. Gets irritated when he/she has to stop doing something he/she is enjoying.*					
36. Usually puts off working on a project until it is due.*					
37. Is able to stop himself/herself from laughing at inappropriate times.*					
38. Is afraid of the idea of me dying or leaving him/her.*					
39. Is often in the middle of doing one thing and then goes off to do something else without finishing it.*					
40. Is not shy.					
41. Doesn't enjoy playing softball or baseball because he/she is afraid of the ball.*					
42. Likes meeting new people.					
43. Feels scared when entering a darkened room at night.*					

	Almost Always Untrue	Usually Untrue	Sometimes True, Sometimes Untrue	Usually True	Almost Always True
44. Wouldn't want to go on the frightening rides at the fair/amusement park.					
45. Hates it when people don't agree with him/her.*					
46. Gets very frustrated when he/she makes a mistake in his/her school work.*					
47. Is usually able to stick with his/her plans and goals.*					
48. Pays close attention when someone tells him/her how to do something.*					
49. Is nervous being home alone.*					
50. Feels shy about new people.					

Personality Questionnaire

PART H	**For each statement, fill in a circle to show how accurately each statement describes you. Describe yourself as you generally are now, not as you wish to be in the future. Describe yourself as you honestly see yourself, in relation to other people you know of the same sex as you are, and roughly the same age.**

	Very Inaccurate	**Moderately Inaccurate**	**Neither Inaccurate or Accurate**	**Moderately Accurate**	**Very Accurate**
1. I am the life of the party.					
2. I feel concern for others.*					
3. I am always prepared.*					
4. I get stressed out easily.*					
5. I have a rich vocabulary.					
6. I don't talk a lot.					
7. I am interested in people.*					
8. I leave my belongings around.*					
9. I am relaxed most of the time.*					
10. I have difficulty understanding abstract ideas.					
11. I feel comfortable around people.					
12. I insult people.*					
13. I pay attention to details.*					
14. I worry about things.*					
15. I have a vivid imagination.					
16. I keep in the background.					
17. I sympathize with others' feelings.*					
18. I make a mess of things.*					
19. I seldom feel blue.*					
20. I am not interested in abstract ideas.					
21. I start conversations.					
22. I am not interested in other people's problems.*					
23. I get chores done right away.*					

	Very Inaccurate	Moderately Inaccurate	Neither Inaccurate or Accurate	Moderately Accurate	Very Accurate
24. I am easily disturbed.*					
25. I have excellent ideas.					
26. I have little to say.					
27. I have a soft heart.*					
28. I often forget to put things back in the proper place.*					
29. I get upset easily.*					
30. I do not have a good imagination.					
31. I talk to a lot of different people at parties.					
32. I am not really interested in others.*					
33. I like order.*					
34. I change my mood a lot.*					
35. I am quick to understand things.					
36. I don't like to draw attention to myself.					
37. I take time out for others.*					
38. I shirk my duties.*					
39. I have frequent mood swings.*					
40. I use difficult words.					
41. I don't mind being the centre of attention.					
42. I feel others' emotions.*					
43. I follow a schedule.*					
44. I get irritated easily.*					
45. I spend time reflecting on things.					
46. I am quiet around strangers.					
47. I make people feel at ease.*					
48. I am exacting at my work.*					

	Very Inaccurate	Moderately Inaccurate	Neither Inaccurate or Accurate	Moderately Accurate	Very Accurate
49. I often feel blue.*					
50. I am full of ideas.					

Aggression Questionnaire

PART K	**Please answer the following statements with reference to YOUR CHILD who is filling out the youth survey. How true is this statement for him/her?**

	Not at all True	**Hardly Ever True**	**Somewhat True**	**Completely True**
1. My child is the kind of person who often fights with others.*				
2. If others have hurt my child, he/she often keeps them from being in his/her group of friends.*				
3. My child often threatens others to get what he/she wants.*				
4. My child is the kind of person who tells his/her friends to stop liking someone.*				
5. My child is the kind of person who ignores others or stops talking to others.*				
6. My child often tells his/her friends to stop liking someone to get what he/she wants.*				
7. My child is the kind of person who hits, kicks, or punches others.*				
8. When my child is threatened by someone, he/she often threatens back.*				
9. My child often hits, kicks, or punches others to get what he/she wants.*				
10. My child is the kind of person who keeps others from being in his/her group of friends.*				
11. When my child is hurt by someone, he/she often fights back.*				
12. My child often keeps others from being in his/her group of friends to get what he/she wants.*				
13. My child is the kind of person who says mean things to others.*				

	Not at all True	Hardly Ever True	Somewhat True	Completely True
14. If others have angered my child, he/she often hits, kicks or punches them.*				
15. My child often puts down others to get what he/she wants.*				
16. If others upset or hurt my child, he/she often tells his/her friends to stop liking them.*				
17. When my child is upset with others, he/she often ignores or stops talking to them.*				
18. My child often gossips or spreads rumours about others to get what he/she wants.*				
19. My child is the kind of person who puts others down.*				
20. If others make my child mad or upset, he/she often hurts them.*				
21. My child often says mean things to others in order to get what he/she wants.*				
22. My child is the kind of person who gossips or spreads rumors.*				
23. My child overreacts angrily to accidents.				
24. My child often ignores or stops talking to others to get what he/she wants.*				
25. My child often hurts others to get what he/she wants.*				
26. When my child is teased or threatened, he/she gets angry easily and strikes back.				
27. My child blames others in fights.				
28. When my child is mad at others, he/she often gossips or spreads rumours about them.*				
29. My child uses physical force in order to dominate other kids/teens.				

	Not at all True	**Hardly Ever True**	**Somewhat True**	**Completely True**
30. My child gets others to gang up on a peer.				
31. My child threatens to bully others.				

Appendix F

Intercorrelations Between Youth, Mother, and Father *Individual* Temperament Variables

Variables	1	2	3	4	5	6	7	8	9
1. Frustration	---								
2. Fear	.32**	---							
3. Effortful Control	-.34**	.04	---						
4. Frustration (m)	.23**	.03	-.19**	---					
5. Fear (m)	.13**	.39**	.00	.27**	---				
6. Effortful Control (m)	-.05	.10*	.49**	-.41**	-.13**	---			
7. Frustration (f)	.20**	.01	-.21**	.48**	.06	-.23**	---		
8. Fear(f)	.07	.33**	-.02	.15**	.48**	-.08	.20**	---	
9. Effortful Control (f)	-.04	.09	.48**	-.25**	-.05	.71**	-.41**	-.14**	---

Note. All correlations involving temperament variables used individual composite means; f = father, m = mother.* $p < .05$ ** $p < .01$. (two-tailed).

Appendix G

Intercorrelations Between Youth, Mother, and Father *Individual* Aggression Subtype Variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. Proactive-overt	---											
2. Proactive-relational	.72**	---										
3. Reactive-overt	.56**	.48**	---									
4. Reactive-relational	.45**	.59**	.47**	---								
5. Proactive-overt (m)	.29**	.18**	.22**	.14**	---							
6. Proactive-relational (m)	.24**	.21**	.17**	.15**	.77**	---						
7. Reactive-overt (m)	.19**	.11*	.37**	.15**	.67**	.59**	---					
8. Reactive-relational (m)	.19**	.22**	.20**	.22**	.52**	.64**	.58**	---				
9. Proactive-overt (f)	.25**	.26**	.23**	.14**	.51**	.41**	.41**	.30**	---			
10. Proactive-relational (f)	.22**	.26**	.20**	.20**	.44**	.42**	.34**	.35**	.77**	---		
11. Reactive-overt (f)	.25**	.24**	.38**	.22**	.45**	.36**	.52**	.32**	.71**	.59**	---	
12. Reactive-Relational (f)	.19**	.22**	.19**	.24**	.31**	.30**	.28**	.37**	.55**	.69**	.56**	---

Note. All correlations involving aggression subtype variables used individual composite means; f = father, m = mother.* $p < .05$ ** $p < .01$. (two-tailed).

Appendix H

Ethics Clearance Form

Original Research Ethics Approval Email

X-Sender: dvancosb@spartan.ac.brocku.ca
X-Mailer: QUALCOMM Windows Eudora Version 5.2.0.9
Date: Mon, 28 Apr 2003 07:36:43 -0400
To: adane@brocku.ca, jeffrey.derevensky@mcgill.ca, jmcphee@brocku.ca,
lroot@nadas.on.ca
From: Deborah Van Oosten <deborah.vanoosten@brocku.ca>
Subject: REB 02-286: Dane et al. - Accepted as clarified
Cc: engemann@ed.BrockU.CA, mowen@spartan.ac.brocku.ca
X-Spam-Status: No, hits=0.9 required=5.0
tests=AWL,EXTRA_MPART_TYPE,MIME_LONG_LINE_QP,SPAM_PHRASE_02_03,
WEB_BUGS
version=2.43-brock-1.01

Senate Research Ethics Board **Extensions 3943/3035, Room AS 302**

DATE: **April 28, 2003**

FROM: Joe Engemann, Chair
Senate Research Ethics Board (REB)

TO: Andrew Dane, Psychology
Jeffrey Derevensky, McGill University
Jennifer McPhee, Community Health Sciences
Lisa Root, Problem Gambling Program

FILE: **02-286, Dane/Derevensky/McPhee/Root**

TITLE: **Parental Socialization of Youth Gambling**

[redacted]

DECISION: Accepted as clarified.

This project has been approved for the period of **April 28, 2003** to **January 30, 2004** subject to full REB ratification at the Research Ethics Board's next scheduled meeting. The approval may be extended upon request. ***The study may now proceed.***

Please note that the Research Ethics Board (REB) requires that you adhere to the protocol as last reviewed and approved by the REB. The Board must approve any modifications before they can be implemented. If you wish to modify your research project, please refer to www.BrockU.CA/researchservices/forms.html to complete the appropriate form ***REB-03 (2001) Request for Clearance of a Revision or Modification to an Ongoing Application.***

Adverse or unexpected events must be reported to the REB as soon as possible with an indication of how these events affect, in the view of the Principal Investigator, the safety of the participants and the continuation of the protocol.

If research participants are in the care of a health facility, at a school, or other institution or community organization, it is the responsibility of the Principal Investigator to ensure that the ethical guidelines and approvals of those facilities or institutions are obtained and filed with the REB prior to the initiation of any research protocols.

The Tri-Council Policy Statement requires that ongoing research be monitored. A Final Report is required for all projects, with the exception of undergraduate projects, upon completion of the project. Researchers with projects lasting more than one year are required to submit a Continuing Review Report annually. The Office of Research Services will contact you when this form ***REB-02 (2001) Continuing Review/Final Report*** is required.

Please quote your REB file number on all future correspondence.

Printed for "Jennifer L. Mcphee" <jmcphee@arnie.pec.brocku.ca> 4/28/2003

Research Ethics Officer
Brock University http://www.brocku.ca/researchservices/
phone: (905)688-5550, ext. 3035 fax: (905)688-0748

Transcript (Clear Text of Email)

X-Sender: dvanoost@spartan.ac.brocku.ca
X-Mailer: QUALCOMM Windows Eudora Version 52.0.9
Date: Mon. 28 Apr 2003 07:36:43 -0400
To: adane@brocku.ca, jeffrey.derevensky@mcgill.ca, jmcphee@brocku.ca,
lroot@nadas.on.ca
From: Deborah Van Oosten <deborah.vanoosten@brocku.ca>
Subject: REB 02-286, Dane et al. - Accepted as clarified
Cc: engemann@ed.BrockU.CA, mowen@spartan.ac.brocku.ca

X-Spam-Status: No, hits=O.9 required=8.0
tests=AWL;EXTRA_MPART_TYPE,MIME_LONG_LINE_QP,SPAM_PHRASE_02_03,

WEB_BUGS
version=2.43-brock-1.01

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Lisa Root, Problem Gambling Program

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an Ongoing Application.

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Please quote your REB file number on all future correspondence.

Research Ethics Officer
Brock University http://www.brocku.ca/researchservices/
phone: (905)688~5550, ext. 3035 fax: (905)688-0748